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Contents

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Feature Article

NUCLEAR POWER

Although total consumption of electricity did not increase during 1974, the generation of electricity from nuclear power continued to experience rapid growth, rising 32 percent above the level for 1973 (Figure 1). Because of the increasing importance of nuclear power, we introduce in this issue of the *Monthly Energy Review* a section that features statistics on nuclear power. After basic facts about nuclear fission and powerplants are presented, the history of nuclear electric power generation and its related fuel industry are described. Finally, information is presented on the environmental and health aspects of nuclear power.

NUCLEAR POWERPLANTS

In a nuclear plant, energy is obtained from the fission (splitting) of the uranium or plutonium atomic nucleus into two smaller nuclei. The combined mass of the fission products is about 0.1 percent less than the mass of the original nucleus. The extra mass, m, is converted into thermal energy, E, as given by Einstein's famous equation, $E=mc^2$, where c is the speed of light.

Two features of nuclear fission make it useful as an energy source: (1) an enormous amount of energy is released per weight of fuel consumed (74 million Btu per gram of material fissioned, the equivalent of burning 3 tons of coal) and (2) fission is self-perpetuating because neutrons[1] both induce fission and are produced by fission. Since only one neutron is needed to cause one fission and several neutrons are released from each fission, a "chain reaction" can occur which sustains the nuclear burning.

All nuclear power reactors have some common elements:

- *Reactor core*—the fuel material and supporting structures in which the primary heat production from fission occurs;
- *Control rod*—device which absorbs the excess fission neutrons when inserted into the reactor core, thus controlling the chain reaction;
- *Moderator*—material which slows down the "fast" (energetic) neutrons, causing them to lose energy and become more likely to initiate the next fission;
- *Coolant*—fluid which transfers the core heat to the steam generator;
- *Steam generator*—device which utilizes the heat from the coolant to generate steam for driving a turbine generator.

Most U.S. reactors are of the light-water reactor (LWR) type in which the coolant and moderator are the same material, ordinary water. There are two classes of LWR's manufactured in the United States, the boiling-water reactor (BWR) manufactured by General Electric and the pressurized-water reactor (PWR) manufactured by Babcock and Wilcox, Combustion Engineering, and Westinghouse (Figure 2). The steam generator in the BWR is the reactor core itself—water is boiled in the core to produce steam which directly drives the turbine. In the PWR, the heated moderator-coolant water is kept as a liquid under pressure and fed to a steam generator outside the reactor core. Steam is then formed in a separate secondary system in the steam generator by transfer of heat into the secondary system.

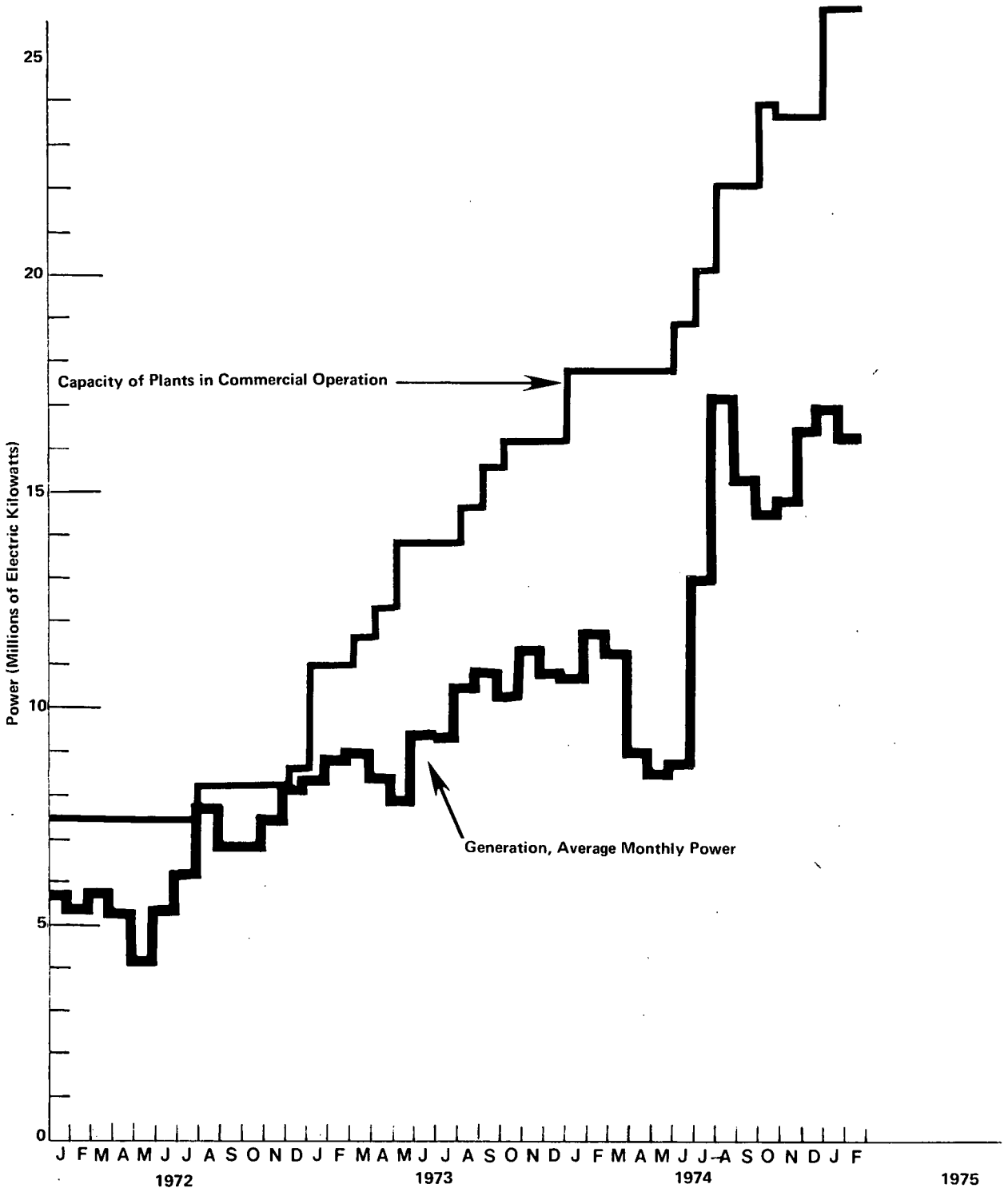
An alternative concept to the LWR is employed by General Atomic in its high-temperature gas-cooled reactor (HTGR). The HTGR moderator is graphite, and the coolant is helium gas under high pressure.

The licensing and construction of a nuclear plant takes approximately 8 years, as shown in Figure 3. 1974 was especially significant because of severe setbacks in plans for future construction. In the last half of 1974, construction deferrals were experienced by 94 of the 194 plants on order, and 14 more were canceled completely. The deferrals represent a loss of over 1 trillion kilowatt hours, which is half the total U.S. electricity generation for 1974. The principal reasons cited for these deferrals and cancellations were difficulty of financing new construction and uncertainty in future requirements due to low growth in electricity demand in 1974. Forecasts of nuclear power growth, based on announced industry plans at the end of the first quarter of 1975, are presented in Table 1. Statistics on announced deferrals and cancellations will be presented in future issues of the *Monthly Energy Review*.

Because large amounts of residual radioactivity are produced by reactor operation and human exposure to such radioactivity can be harmful, a great deal of attention is paid by the industry and the Nuclear Regulatory Commission to safety features for confinement of this radioactivity. The worst conceivable accident for an LWR is the so-called "loss of coolant accident." If all the coolant water in the core is lost, the nuclear fissioning can no longer occur since the water is also needed to moderate the neutrons. However, radioactive decay of the residual wastes in the fuel generates

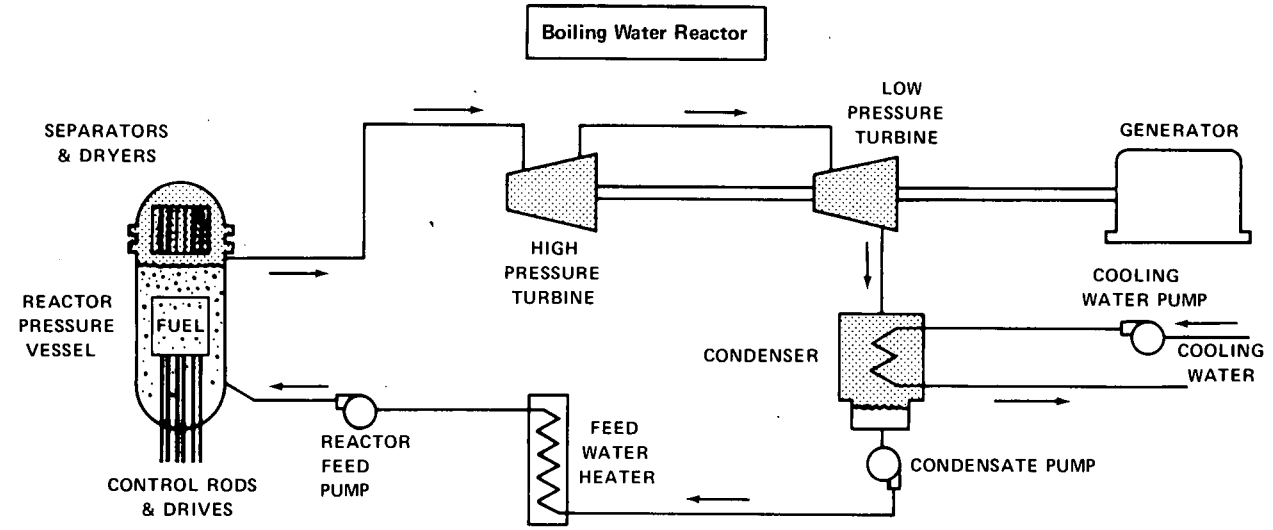
[1] See Explanatory Note 1 for a description of neutrons.

Figure 1. U.S. Nuclear Electric Power Generation and Capacity, 1972 to Present



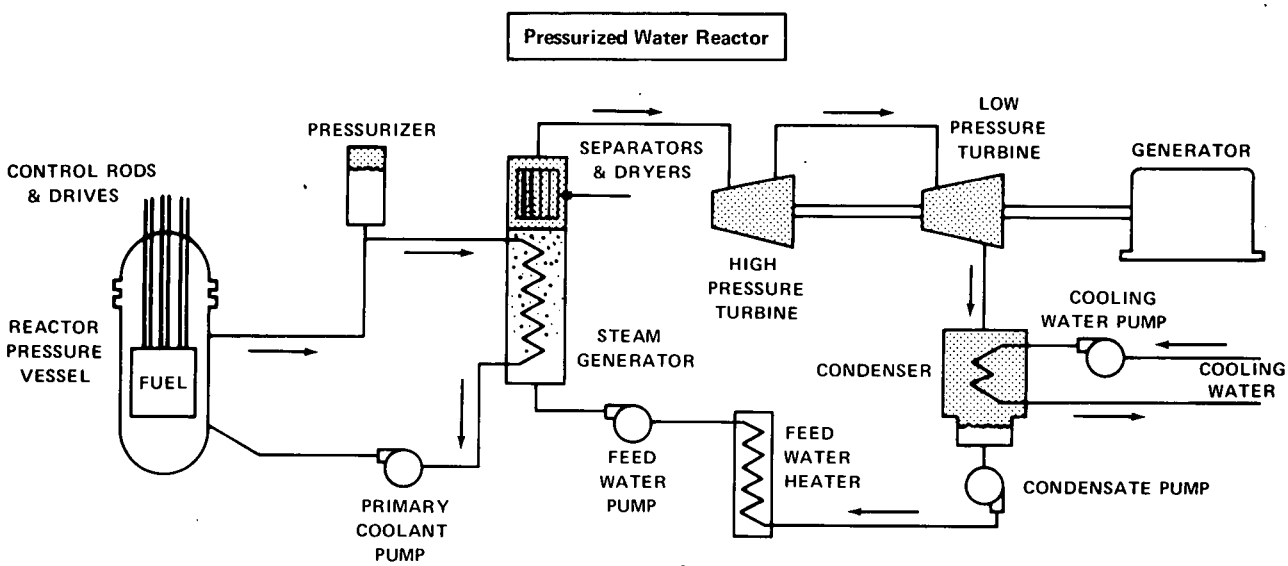
Source: Capacity—U.S. Nuclear Regulatory Commission;
Generation—Federal Power Commission.

Figure 2. Schematic Diagrams of LWR Reactors



GENERAL ELECTRIC

FUEL Slightly enriched uranium oxide clad with zirconium alloy
MODERATOR Boiling water
COOLANT Boiling water
PRESSURE OF PRIMARY SYSTEM 1,000 psi
OUTLET TEMPERATURE 550° F

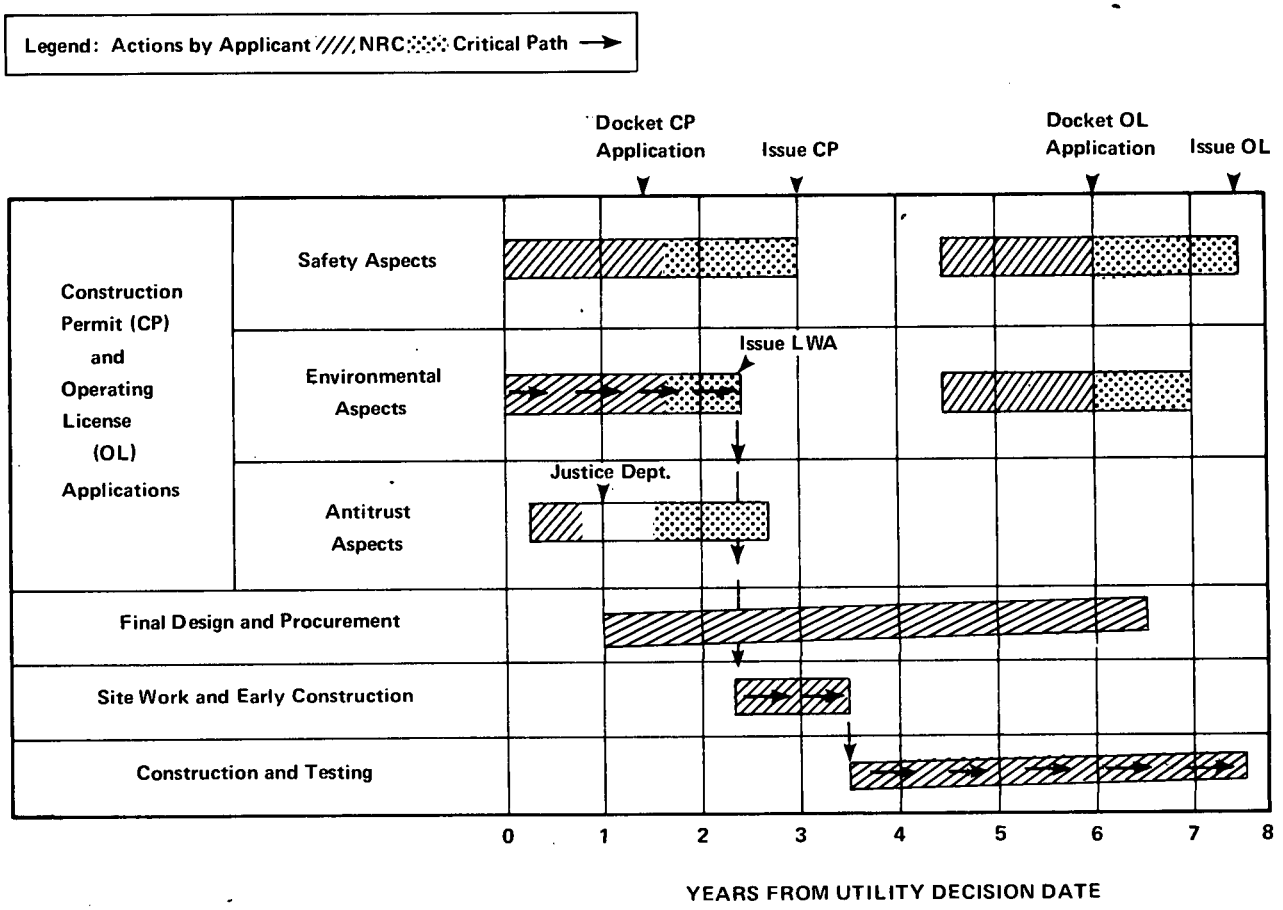


BABCOCK & WILCOX
COMBUSTION ENGINEERING
WESTINGHOUSE

FUEL Slightly enriched uranium oxide clad with zirconium alloy
MODERATOR Water
COOLANT Water
PRESSURE OF PRIMARY SYSTEM 2,250 pounds per square inch
REACTOR OUTLET TEMPERATURE 605° F

Source: The Nuclear Industry, 1974 (Report No. WASH 1174–74, U.S. Atomic Energy Commission).

Figure 3. Time Required From Conception to Operation of Nuclear Plants
(With Limited Work Authorization Procedure)



Source: U.S. Nuclear Regulatory Commission (NRC).

Table 1. Projected Installation of U.S. Nuclear Power Reactors

Year of Expected Commercial Operation	Number of Reactors		Capacity	
	Annual	Cumulative	Annual	Cumulative
			Net electrical megawatts	
1975	17	61	14,120	43,170
1976	7	68	6,677	49,847
1977	7	75	6,749	56,596
1978	8	83	7,823	64,419
1979	10	93	10,905	75,324
1980	18	111	19,279	94,603
1981	22	133	23,814	118,417
1982	24	157	27,410	145,827
1983	22	179	24,484	170,311
1984	21	200	22,687	192,998
1985	13	213	14,612	207,610

Source: *Nuclear Industry Status,* Nuclear Assurance Corporation Quarterly Report, April 1975.

so much heat that the reactor core could melt, with possible release of radioactivity to the environment.

An early study[2] by the Atomic Energy Commission (AEC) indicated that the consequences of such an accident could be catastrophic. Accordingly, Congress enacted the Price-Anderson Act which contained provisions for insuring and indemnifying the public against a nuclear accident. The Act expires in 1977, and attempts at its renewal are being tied to the completion of an ongoing technical study of reactor accident probabilities, the "Rasmussen study." A draft form of the study's findings[3] has generated a great deal of controversy and will probably become the focal point of debate in the

[2] Report No. WASH-740, U.S. Atomic Energy Commission.

[3] *Reactor Safety Study, An Assessment of Accident Risks in U.S. Commercial Nuclear Power Plants,* Report No. WASH-1400, U.S. Atomic Energy Commission (August 1974).

present Congress when renewal of the Price-Anderson Act is considered.

The key indicator for operating reliability is the capacity factor, defined as the ratio of the nuclear plant's generated electricity to its maximum design capability. The target of the nuclear industry has been an 80-percent capacity factor; however, the industry average has been approximately 60 percent for the past several years. Although fossil plants of comparable size to the newest nuclear plants have experienced similar reliability problems, nuclear plants are more capital intensive, and thus shutdowns more severely affect the cost of producing electricity.

Table 2 summarizes the international generation of electricity from nuclear power. This table shows that in 1974 the United States generated 48 percent of the non-Communist world's nuclear electricity, but our plants operated at lower capacity factor than the world average. Canada's CANDU reactors (pressurized heavy-water[4] moderated and fueled with non-enriched uranium) performed quite well in comparison to all others, while the gas-cooled, graphite-moderated reactors of Great Britain performed only slightly better than our light-water reactors.

Monthly statistics on installed capacities, generated electricity, and capacity factors will be presented in the nuclear section of the *Monthly Energy Review.*

THE NUCLEAR FUEL CYCLE

Several physical and chemical steps are necessary to process the fuel and radioactive wastes of a nuclear powerplant. The collective generic term for these processes is the nuclear fuel cycle, illustrated in Figure 4. Each step is described below. Table 3 provides summary information on existing and potential fuel cycle facilities. Table 4 provides historical data.

Mining—Uranium-bearing ore is removed from the earth in underground or open-pit mines by methods similar to those used for other metal ores. Uranium ores are low-grade, with an average uranium content of approximately 0.2 percent. Enriching of imported uranium for commercial power use is currently prohibited, but will be phased-in starting in 1977. Known U.S. reserves of uranium oxide (U_3O_8) in the $15-per-pound cost category are in the neighborhood of 400,000 tons. In the $30-per-pound category, known reserves are 600,000 tons. The latter could produce approximately 2.4 million megawatt-years of electricity which is equivalent to almost 11 years of current electrical production in the United States from all fuels. Thus, the extent of our uranium resources amy be the growth-limiting factor for future U.S. nuclear power production. The Energy Research and Development Administration (ERDA) is currently engaged in a program (National Uranium Resource Evaluation Program) to obtain comprehensive geological data needed to determine the size of our uranium resources.

Milling—Ores are crushed and ground, and the uranium chemically extracted. The uranium fraction is converted to U_3O_8 ("yellow-cake") for shipment; the remainder of the ore is a waste product called mill tailings.

Conversion—U_3O_8 is chemically converted to the more volatile hexafluoride, UF_6, which is feed for the subsequent enrichment stage.

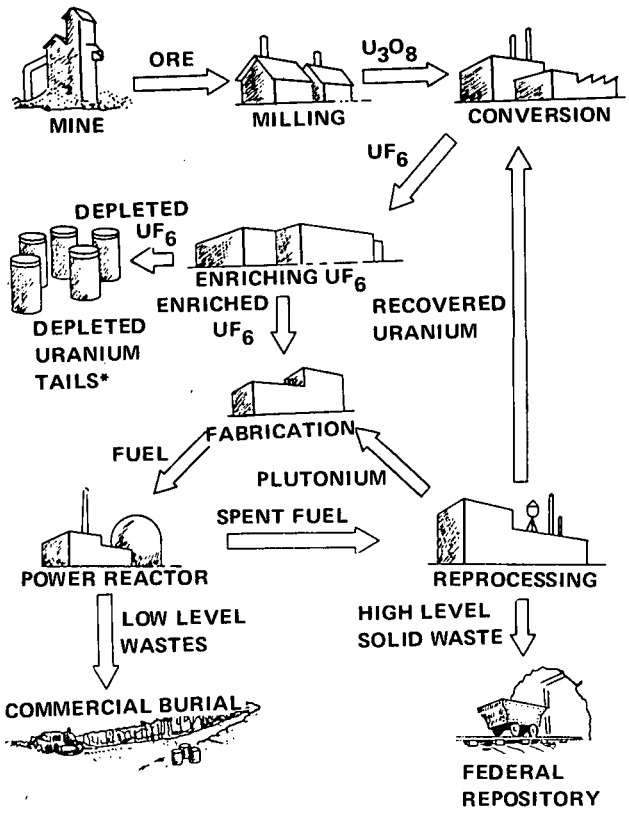
Table 2. Commercial Nuclear Power Generation in Major Non-Communist Countries

Country	Number of Reactors	Gross Electricity Generation		Capacity Factor	
		Year 1974	January 1975	Year 1974	January 1975
		In billion kilowatt hours		In percent	
Japan	8	15.08	1.52	61	52
Canada	5	15.41	1.17	74	65
Federal Republic of Germany	7	11.16	1.49	57	73
France	10	14.75	1.90	57	84
Great Britain	29	33.00	2.83	61	62
Italy	3	3.42	0.37	61	80
Spain	3	6.94	0.72	75	88
Switzerland	3	7.04	0.76	76	96
United States	42	98.02	14.97	57	59
Totals	110	204.82	25.73	63	63

Source: Nucleonics Week Magazine.

[4] See Explanatory Note 2 for description of heavy-water.

Figure 4. The Nuclear Fuel Cycle



*NOT REQUIRED FOR REACTOR BUT MUST BE STORED SAFELY. HAS VALUE FOR FUTURE BREEDER REACTOR BLANKET.

Source: Adapted from the Nuclear Industry, 1974. (U.S. Atomic Energy Commission Report No. WASH-1174-74).

Enrichment—Natural uranium consists of two isotopes,[5] U-238 and U-235. If natural uranium were used in an LWR, the non-fissionable U-238 and the coolant-moderator water would absorb so many neutrons that a chain reaction could not be sustained. To maintain the chain reaction, the uranium fuel must have a greater percentage of fissionable U-235. The process of increasing the percentage of U-235 in the uranium fuel is called enrichment.

The technique presently used for enriching consists of heating the UF_6 to its gaseous state and forcing it to diffuse through a large number of porous barriers. Because the fissile U-235 has a smaller atomic weight than non-fissile U-238, it diffuses slightly faster and the resultant product has a higher U-235 content. The net result of this process is the separation of the natural uranium into two groups, one enriched in U-235 and the other depleted in U-235 ("enrichment tails"). The energy expended in enrichment (which determines its cost) is called "separative work" and is measured in grams of Separative Work Units, or SWU (see Definitions). Figure 5 shows the relationships among SWU, product and tails assays, and the energy and material requirements for enrichment of typical LWR fuel.

Although ERDA is actively expanding the enriching capability of its three existing plants, the projected demand overtakes ERDA's projected capacity sometime during the early 1980's. As a result, ERDA has been preproducing enriched uranium and encouraging private ventures in both the standard gaseous diffusion enrichment process and the newly developed gas centrifuge process. Although economically undemonstrated at present, the centrifuge process warrants further consideration, since a centrifuge plant would require only 10 percent of the electric power used by a diffusion plant for the same amount of separative work.

Fabrication—Enriched UF_6 is changed to uranium dioxide (UO_2), formed into ceramic pellets, and sealed in corrosion-resistant zircalloy or stainless steel tubes. The loaded tubes, called elements, are mounted in assemblies for ease in loading and unloading at the reactor.

Power reactor—With the fuel assemblies in place, the reactor is ready for operation. Table 5 shows design characteristics of fuel flow through typical BWR and PWR reactor cores. Note that about one-fourth to one-third of the core is refueled each year.

It is mentioned in Explanatory Note 5 that U-238 can absorb a neutron and form fissile Pu-239. This process occurs on a significant scale inside the reactor core because of the presence of large numbers of neutrons and U-238 nuclei. In fact, the subsequent fissioning of Pu-239 formed within the reactor core accounts for about one-third of the energy derived from the nuclear fuel.

The reactor must be refueled before all the U-235 and Pu-239 are fissioned because of the buidup of certain fission products which "poison" the reactor by absorbing so many neutrons that the chain reaction can no longer be sustained.

Reprocessing—Spent (discharged) fuel from reactor operation is shipped to reprocessing plants for chemical separation into its three components—uranium, plutonium, and radioactive waste. The recovered uranium has a higher percentage of U-235 than natural uranium (see Table 5), and thus makes excellent enrichment feed material. The plutonium serves as a direct substitute for U-235 when blended with uranium. This uranium and

[5] See Explanatory Note 5 for discussion of uranium isotopes.

Table 3. Nuclear Industry Facility Summary*

Phase of Nuclear Fuel Cycle	Industry Capability			Planning and Construction		
	Number of Facilities	Maximum Capacity	Reactors Supported**	Plant Size Range	Lead Time (Years)	Cost (Dollars per kWe)
Mining and Milling	200 mines 16 mills	13,800 MTU/year	90	400-1200 MTU/year	***8-10	20-40
Conversion	2	17,200 MTU/year	65	4,500-12,700 MTU/year	4	1-2
Enrichment	3	12.3 million SWU/year	120	0.6-9 million SWU/year	†5-8	33
Fabrication	5	2,900 MTU/year	85	150-1,150 MTU/year	4	2-3
Electricity Generation	††52	34,800 MWe	—	325-1300 MWe	8	600-720
Reprocessing	1	0	0	300-1500 MTU/year	8-7	11

*See Explanatory Notes 3 and 4 for discussion of units of measure.
**1000 MWe size. Derived from data provided in Report No. WASH-1174-74 (U.S. Atomic Energy Commission).
***Lead time includes time for exploration activity necessary to determine proved reserves. Lead time for construction of a mill is 2 to 3 years.
†Gaseous diffusion plant assumed.
††Includes plants in start-up testing.
Source: U.S. Nuclear Regulatory Commission and industry sources.

Table 4. Historical Data on the Nuclear Fuel Cycle*

	Milling	Conversion	Enrichment			Fabrication			Powerplant
	Yellow-Cake Sales	Sales	Domestic	Foreign	Stockpile	Receipts	Shipments	Production	Fuel Discharges
1972									
1st Quarter	NA	NA	254	266	NA	NA	NA	286	110
2nd Quarter	NA	NA	402	289	NA	195	144	43	77
3rd Quarter	NA	NA	1,316	567	NA	445	197	524	24
4th Quarter	NA	NA	703	748	NA	319	415	163	25
Total	NA	NA	2,675	1,870		NA	NA	1,016	236
1973									
1st Quarter	5,150	7,300	597	704	NA	277	102	136	36
2nd Quarter	10,690	6,700	1,161	2,094	NA	373	162	164	73
3rd Quarter	1,380	3,440	942	9,210	NA	310	182	218	30
4th Quarter	13,800	19,000	1,188	689	15,380	404	308	483	16
Total	31,020	36,440	3,888	12,697		1,364	754	1,001	155
1974									
1st Quarter	2,040	5,120	926	531	17,290	340	526	245	71
2nd Quarter	3,600	3,790	1,424	805	18,000	331	357	26	139
3rd Quarter	4,390	2,640	1,165	375	19,690	412	263	360	67
4th Quarter	12,460	22,840	738	1,154	21,160	501	275	226	174
Total	22,490	34,390	4,253	2,865		1,584	1,421	857	451

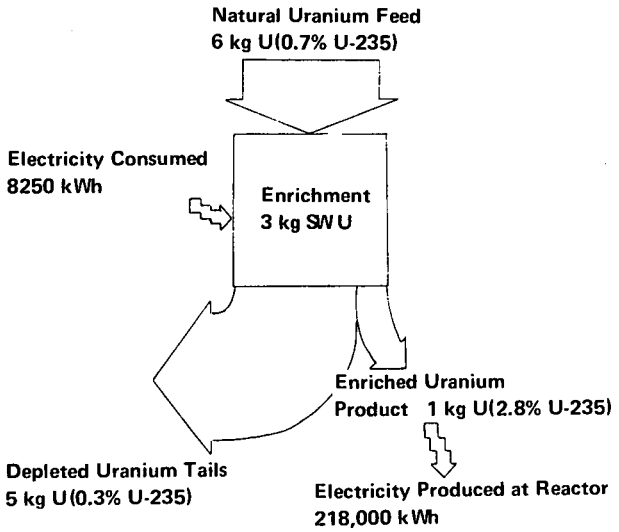
*All units are MTU except those for enrichment, which are MT-SWU. See Explanatory Note 3 for discussion of units.
NA = Not available.
Source: Enrichment statistics are from Enrichment Branch, ERDA, Oak Ridge, Tennessee; all others are from *Nuclear Industry Status,* Nuclear Assurance Corporation Quarterly Reports.

plutonium recycling can reduce the natural uranium feed requirement by 12 percent and the enrichment work requirement by 15 to 25 percent.

The economic and resource conservation benefits of recycling are offset by other factors. Plutonium is as toxic per unit of weight as nerve gas. Although the uranium used in power reactors is not of sufficiently high enrichment for weapon fabrication, a nuclear bomb can be made from relatively small amounts of plutonium. Thus, extreme caution must be taken in handling and transporting plutonium. (These issues are discussed further in the draft environmental statement on plutonium recycle.[6])

[6] *Generic Environmental Statement on Mixed-Oxide Fuel (GESMO),* Report No. WASH-1327, U.S. Atomic Energy Commission (August 1974).

Figure 5. Energy and Material Balance in Enrichment



Source: U.S. Atomic Energy Commission.

Recycling in LWR's has been done only on a small scale to verify that there are no detrimental effects on reactor operation. Recovery of uranium and plutonium in anticipation of recycling has occurred on a larger scale, but today there are no reprocessing plants operating, and thus facilities for storage of spent fuel are becoming filled to capacity. In fact, some reactors are in danger of having to shutdown in the future because of lack of space to store their discharged fuel.

One of the key policy decisions that must be made by the Nuclear Regulatory Commission involves plutonium recycling. If it is determined that the benefits of recycle do not outweigh the societal risks, then future requirements for mined uranium and enrichment are affected as well as the need for reprocessing plants. Also affected is the future of the breeder reactor discussed next.

THE LIQUID METAL FAST BREEDER REACTOR (LMFBR)

A fast reactor is one which has no moderator. Fissioning is thus induced by "fast" neutrons produced from previous fissions which have not been slowed down. The probability for fertile U-238 absorbing a neutron to form Pu-239 is greater for fast neutrons than for slow ones. When a "blanket" of U-238 is placed around the core of a fast reactor, it is known as a "breeder" reactor because more fissile atoms are formed in the blanket than are consumed in the core. The use of breeder reactors would extend the effective life of our uranium resources because more than 50 percent of the U-238 could be utilized for fuel instead of 0.3 percent which is utilized with the present LWR technology. However, since the Pu-239 produced in the blanket must be separated from the U-238, all the problems of LWR plutonium recycling are magnified several fold.

France has operated a 250-megawatt fast breeder for over a year and is developing larger plants. Other countries with fast breeder programs are Russia, West Germany, Japan, and the United States.

A demonstration fast breeder reactor, with liquid sodium metal as the coolant, is being built on the Clinch River in Tennessee. The initial cost estimate for the 450-megawatt plant was about 500 million dollars, half of which was committed by Commonwealth Edison Company and the Tennessee Valley Authority, and the other half by the AEC (now ERDA). The cost estimate has now escalated to 1.4 billion dollars, bringing the project under close Congressional scrutiny and forcing a management reorganization of the project. Thus, the future of the Clinch River Breeder Reactor, and of the breeder program in general, is in jeopardy pending resolution of financial problems and the plutonium recycle question.

WASTE DISPOSAL AND ENVIRONMENTAL EFFECTS

There are two types of wastes from nuclear power: waste heat and nuclear radiation. A typical large nuclear plant has a heat-to-electricity conversion efficiency of 32.0 percent; in other words, 68 percent of the heat generated is wasted. (For comparison, the conversion efficiency for coal-fired electric plants is about 33.6 percent.) Until recently, the waste heat was discharged into surface waters near the plants, but significant ecological damage resulted. The United States Environmental Protection Agency (EPA), which sets air and water quality standards, now requires that all large nuclear and fossil electric powerplants have closed-cycle heat disposal systems (cooling towers) which disperse the heat to the atmosphere rather than the waterways. This requirement, however, adds significant costs to nuclear plant construction and reduces the efficiency of electric power generation.

The second waste product of nuclear power poses a much more formidable problem. Radioactive wastes are composed of fission product nuclei, radioactive nuclei formed when reactor component materials (stainless steel, water, etc.) absorb reactor neutrons, and actinide nuclei (such as thorium, uranium, plutonium), formed by the natural decay of uranium at mines and mills or from multiple neutron absorption by uranium nuclei in

Table 5. Fuel Flows in Typical BWR and PWR Reactors*

Reactor Type	Fuel in Core	Burn-up at Discharge	Core Fraction Annually Discharged	Loading Enrichment	Discharge Enrichment	Discharge Plutonium
	MTU	MWD/MTU		Percent U-235		Kg/MTU
BWR	150	28,000	0.24	2.6	0.8	8
PWR	85	31,000	0.34	3.0	0.9	10

*See Explanatory Note 3 and 4 for discussion of units.
Source: *Nuclear Industry Status,* Nuclear Assurance Corporation Quarterly Report.

the reactor fuel. The actinide wastes have such long half-lives[7] that their radiation hazard lingers for thousands of years. However, their radiation is not very penetrating and they must be ingested to do harm.

In November 1972, the National Academy of Sciences completed a study on the biological effects of radiation. Estimates were made of the average annual radiation exposures of the American populace and are given in Table 6. EPA estimates that the maximum average exposure due to future nuclear industry in the United States will be 1 millirem[8] per year, which is only 1 percent of natural background radiation. Current Nuclear Regulatory Commission standards for all effluents from LWR operations specify that no person at or beyond the site boundary at a power plant shall be exposured to an incremental dose of more than 10 millirems per year, which is 10 percent of the exposure due to natural background or 14 percent of the medical X-ray exposure shown in Table 6. The two harmful biological effects of exposure to these low radiation levels are cancer and birth defects due to genetic mutation. It should be mentioned that coal-burning also produces radioactive emissions due to radium and thorium impurities in coal. Actual measurements 1 to 2 miles downwind from a 1,000-megawatt coal plant range from 0.3 to 24 millirem per year.

Table 6. Estimates of Annual Whole-Body Radiation Dose Rates in the United States, 1970*

Source	Average Dose Rate	Percent of Total Dose
	Millirems per year	
Environmental		
Natural	102	56.1
Global Fallout	4	2.2
Nuclear Power	0.003	0.002
Subtotal	106	58.3
Medical		
Diagnostic	**72	39.6
Radiopharmaceuticals	1	0.6
Subtotal	73	40.2
Occupational	0.8	0.4
Miscellaneous	2	1.1
TOTAL	182	100.0

*For given segments of the population, dose rates considerably greater than these average values may be experienced.
**Based on the abdominal dose.
Source: *The Effects on Populations of Exposure to Low Levels of Ionizing Radiation* (National Academy of Sciences-National Research Council, November 1972).

Most of the radioactive wastes from nuclear power do not get released at the powerplant because they are trapped within the fuel rods. Ninety-nine percent of the radioactive waste is extracted from the spent fuel at the reprocessing plant. This concentrated "high-level" waste contains both fission products and actinides. A firm policy for disposition of the high-level waste has not been established. ERDA, which is responsible for policy in this area, at one time favored encapsulating the waste and disposing of it in geological formations such as bedded salt. However, public pressure and technological set-backs at the proposed Lyons, Kansas, disposal site have forced a reassessment of that policy. After considering the use of temporary facilities to hold the wastes for 20 to 30 years while other geological sites or alternative technologies could be investigated, ERDA recently returned to advocacy of bedded salt formations.

An estimate of the total health effects from a 1,000-megawatt nuclear plant are given in Table 7. These figues

[7] See Explanatory Note 1 for a discussion of half-life.

[8] The millirem is a unit of measure for the amount of biological damage produced by radiation.

Table 7. Health Effects of Civilian Nuclear Power

Activity	Fatalities per 1000 MWe Plant-year			Injuries
	Accidents (not radiation-related)	Radiation-related (cancers and genetic)	Total	Man-days lost
Uranium mining and milling	0.173	0.001	0.174	330.5
Fuel processing and reprocessing	0.048	0.040	0.099	5.6
Design and manufacture of reactors and instruments	0.040	NA	0.040	24.4
Reactor operation and maintenance	0.037	0.107	0.144	158
Waste disposal	NA	0.0003	0.0003	NA
Transport of nuclear fuel	0.036	0.010	0.046	NA
Totals	0.334	0.158	0.492	518

NA = Not available.
Source: P. Walsh, as quoted in D.J. Rose, "Nuclear Electric Power" *Science* (19 April 1974).

indicate that one fatality could be expected for every 2 years of operation of a nuclear plant. For comparison, operation of a coal-burning plant of the same size results in one death from mining accidents every 2 years. In addition, there are presently about 100 coal miners totally incapacitated due to black lung disease for each coal-burning plant in operation, although this number will probably decrease in the future because of more stringent safety standards in the mines. Fatalities due to sulfur emissions from coal burning could be as high as 40 to 100 per year by 1980 for each 1,000-megawatt plant in operation if there is no requirement for the removal of sulfur from the stack gases. With stringent sulfur removal requirements, the fatality rate becomes minuscule.

In conclusion, the nuclear power industry, still in its infancy, is beset by many problems, several of which are tied to financial woes of the electric utility industry, and others of which are basically related to public acceptance of the risks of nuclear power. In the nuclear section of the *Monthly Energy Review* we will monitor industry growth and price trends, capacity utilization, energy consumed in nuclear fuel processing, and import-export activity for nuclear fuels and services.

Part 1 Overview

For the first 2 months of 1975, production of energy in the United States was 1.4 percent below the same period last year. Crude oil exhibited the sharpest decline, down 5.0 percent, while natural gas production declined 2.6 percent. Together, these two fuels accounted for about 67.5 percent of the total output during January and February. Coal, which contributed 24.5 percent of domestic energy production, was the only major energy source that showed a production increase for these months, up 1.5 percent from 1974.

Imports of fossil fuels were 18.9 percent higher than in January and February 1974, when the Arab oil embargo was in effect. They were also 2.7 percent higher than during the same period in 1973. The largest increase was posted by crude oil, up 73.0 percent from last year. A pronounced 21.9-percent decline, however, was registered for refined petroleum product imports. In fact, product imports during February were at their lowest level since October 1971. Natural gas imports have also declined from their levels during the first 2 months of 1974, but only by 1.2 percent. Preliminary data indicate that during February the principal sources of crude oil imports were Nigeria, accounting for 22 percent of the total, and Canada, 13 percent, while about 82 percent of refined product imports came from Caribbean refineries.

During January 1975, the United States consumed 1.0 percent more energy than in January 1974, but 3.5 percent less than for the same month in 1973. Consumption of refined products, which accounted for 43.7 percent of total domestic energy consumption, showed a 1.8-percent gain over last year, while consumption of natural gas (accounting for 33.1 percent of the total) declined by an equal amount. Coal consumption (17.3 percent of the total) was down slightly by 0.3 percent. In contrast, nuclear power consumption increased a substantial 72.4 percent, while consumption of hydroelectric power was up 0.5 percent. These two energy sources, however, supplied only 5.9 percent of domestic energy demand during the month.

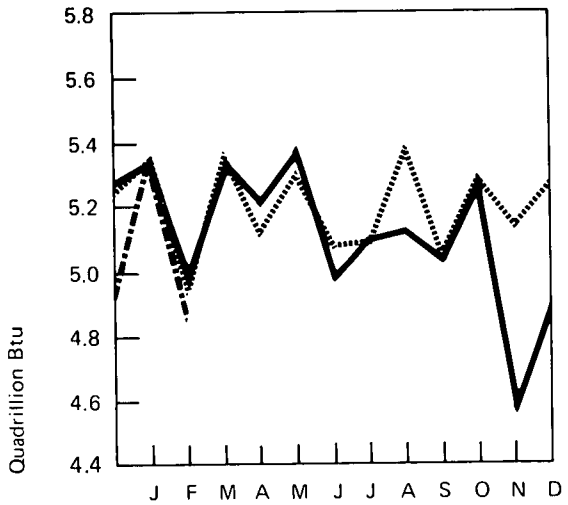
Stocks of distillate and residual fuel oil continued to exhibit normal seasonal drawdowns in February, declining 13.7 and 5.2 percent, respectively, from their levels at the end of January. On the other hand, crude oil inventories increased 4.3 percent in February, reaching their highest levels since May 1972. Motor gasoline stocks also increased seasonally during the month, closing 2.8 percent higher than their January levels, as they reached their highest levels since February 1972. Stocks of natural gas liquids at the end of 1974 were 15.1 percent above levels a year ago. Coal inventories at the end of January, however, were 4.6 percent below January 1974.

Production of electricity for the first 2 months of 1975 was 4 percent greater than for the corresponding period in 1974. As a consequence, consumption of coal and fuel oil at electric utilities was also higher. Utility plants consumed 2 percent more coal and 16 percent more oil to generate electricity in January 1975 than in January 1974. Curtailments of natural gas, however, resulted in an 8-percent decrease in utility consumption of that fuel. Total sales of electricity during 1974 declined 0.3 percent from 1973. Sales to commercial customers exhibited the largest decrease at 1.2 percent. In contrast, industrial sales were up 0.3 percent, while sales to residential customers were essentially unchanged. Utility fuel stocks remained favorable at the end of January, with coal inventories representing a 72-day supply and oil a 63-day supply.

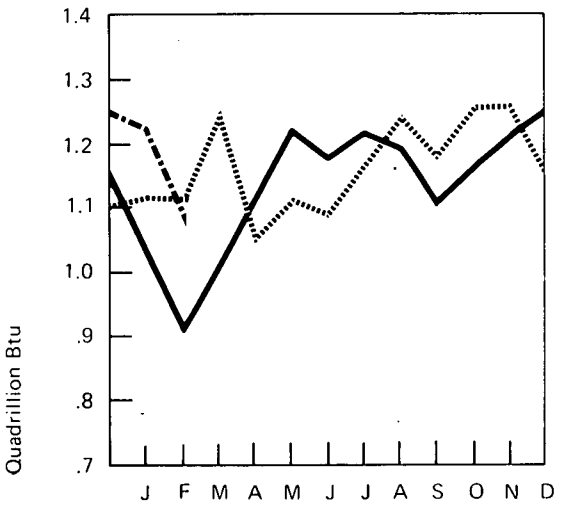
Following a 0.4-percent per gallon increase in January, the national average selling price of regular gasoline advanced only 0.1 cent per gallon in February. Retail gasoline prices are now 3.7 cents (7.6 percent) higher than a year ago and 15.7 cents (42.7 percent) higher than in February 1973. Average residential heating oil prices dropped for the second consecutive month in January to 36.2 cents per gallon. On the other hand, crude oil prices generally increased during the month. Although the cost of imported crude petroleum to the refiner decreased 19 cents per barrel in January, a 31-cent per barrel advance was posted in the refiner acquisition cost of domestic crude, resulting in a 28-cent per barrel increase in the composite cost of crude to the refiner.

Exploration activity for oil and gas in February remained well ahead of levels experienced last year. An average of 19 percent more rotary rigs were drilling for petroleum than in February 1974, and 7 percent more wells were completed during the month. The average number of seismic crews engaged in prospecting for oil and gas numbered 302, a net gain of 1 crew over the January count.

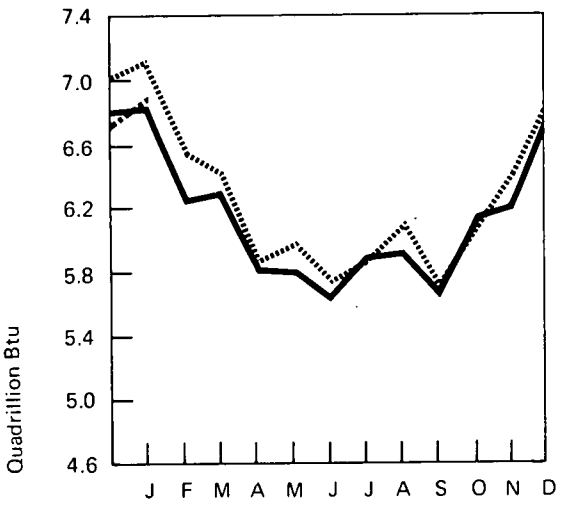
Domestic Production of Energy*



Imports of Fossil Fuels



Domestic Consumption of Energy**



*See Explanatory Note 6.

**See Explanatory Note 7.

..... 1973
— 1974
-.-. 1975

CRUDE OIL

After rising in January contrary to the normal seasonal pattern, crude oil production fell to 8,489,000 barrels per day in February, a level comparable to that of November and December 1974.

For the 3-month period ending February, crude oil production averaged 8,536,000 barrels per day, down slightly more than 500,000 barrels per day from the same period a year ago.

Imported crude oil receipts reported at refineries and terminals amounted to 4,061,000 barrels per day in February, up slightly from the previous month.

Crude oil stocks at refineries and major pipeline and marine terminals reached 264,833,000 barrels, the highest level since May 1972.

TOTAL REFINED PETROLEUM PRODUCTS

Domestic demand for total refined petroleum products for the period November 1974 through February 1975 averaged 17,425,000 barrels per day, 1.4 percent less than the same period last year.

Imports of refined products fell to 2,138,000 barrels per day, the lowest level since October 1971. Product imports during the month were 28 percent less than in February 1974 and 41 percent less than February 1973.

OIL HEATING DEGREE-DAYS

During February, the continental United States accumulated 5.6 percent less distillate oil heating degree-days than is normal for that month, reflecting higher than normal temperatures. This was the third consecutive month that total U.S. distillate oil degree-days were lower than normal.

Cumulative oil heating degree-days for the 1974-75 heating season continued to be higher than those of the previous heating season (by 3.0 percent), but were 5.4 percent below normal.

NATURAL GAS LIQUIDS

Production of natural gas liquids in 1974 totaled 616,098,000 barrels, a decline of 2.9 percent from the 1973 total of 634,423,000 barrels.

NATURAL GAS

Total marketed production during 1974 was 21,938 billion cubic feet, representing a decline of 3.2 percent from 1973 when 22,648 billion cubic feet were produced.

Imports fell from 1,033 billion cubic feet in 1973 to 959 billion cubic feet in 1974, a decline of 7.2 percent.

Domestic producer sales to major interstate pipelines were down 5.1 percent in 1974 compared with the previous year.

COAL

Production of bituminous coal and lignite in February 1975 was 49 million tons, virtually the same as in February 1974.

Exports for January 1975 were 15 percent below the average for the previous 12 months.

Revised consumption for the year 1974, at 551 million tons, was 5 million tons below 1973.

Part 2

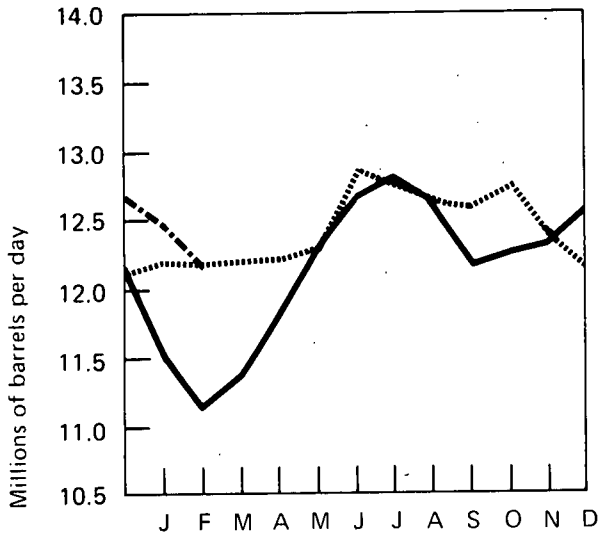
Energy Sources

Crude Oil

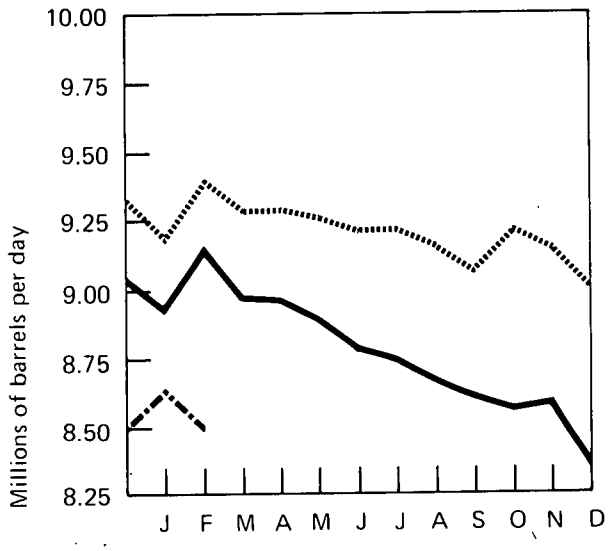
		Crude Input to Refineries		Domestic Production		Imports		Stocks*	
		In thousands of barrels per day						In thousands of barrels	
		BOM	FEA	BOM	FEA	BOM	FEA	BOM	FEA
1972	January	11,388		9,114		2,046		236,776	
	February	11,356		9,336		2,081		238,882	
	March	11,345		9,462		2,067		244,860	
	April	11,184		9,513		2,004		253,492	
	May	11,478		9,614		2,160		265,305	
	June	11,841		9,522		2,085		257,601	
	July	11,885		9,496		2,182		251,913	
	August	11,915		9,483		2,112		244,333	
	September	12,112		9,508		2,364		237,085	
	October	11,871		9,482		2,516		239,949	
	November	11,851		9,426		2,299		237,519	
	December	12,113		9,335		2,667		232,803	
1973	January	12,190		9,179		2,732		224,056	
	February	12,187		R9,395		2,873		221,893	
	March	12,201		R9,272		3,162		230,696	
	April	12,208		R9,292		3,049		235,383	
	May	12,281		R9,262		3,215		244,777	
	June	12,862		R9,214		3,220		235,846	
	July	12,750		R9,217		3,501		230,750	
	August	R12,635		R9,169		3,593		235,660	
	September	12,560		R9,065		3,471		228,280	
	October	12,758		R9,224		R3,739		233,520	
	November	12,374		R1,161		3,452		237,001	
	December	12,150		R9,063		2,891		229,504	
1974	January	11,491		8,907		2,382		220,261	
	February	11,102		9,156		2,248		228,004	
	March	11,355		8,950		2,462		231,705	
	April	11,823		8,952		3,267		243,687	
	May	12,333	12,777	8,903		3,908	3,748	256,726	252,270
	June	12,697	12,709	8,777		3,925	3,957	255,762	253,008
	July	12,811	12,905	8,754	8,698	4,091	4,167	255,936	252,399
	August	12,644	12,731	8,682	8,717	3,924	3,852	251,905	247,040
	September	12,124	12,253	8,621	8,622	3,797	3,758	253,623	249,476
	October	12,286	12,430	8,568	8,651	3,810	3,936	256,430	255,003
	November	12,332	12,402	8,596	8,458	3,958	3,997	258,123	256,271
	December	12,519	12,671	8,352	8,471	3,869	3,979	252,158	248,808
1975	January		12,436		R8,644		3,964		R253,836
	February		**12,144		**8,489		**4,061		**264,833

*See definitions.
**Preliminary data.
R=Revised data.
Sources: Bureau of Mines (BOM) and Federal Energy Administration (FEA) as indicated.

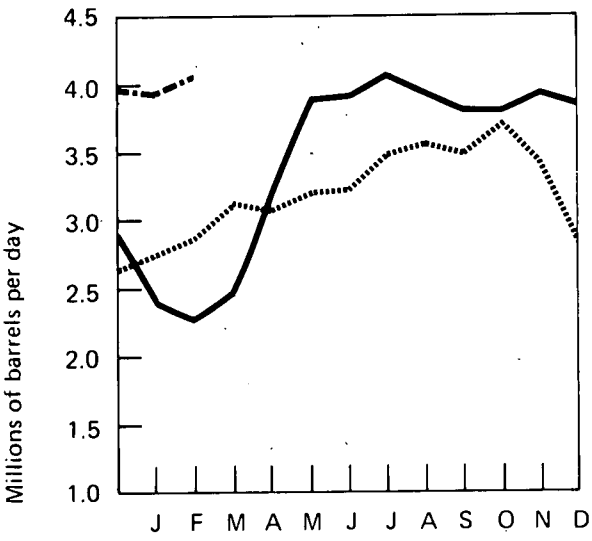
Crude Input to Refineries*



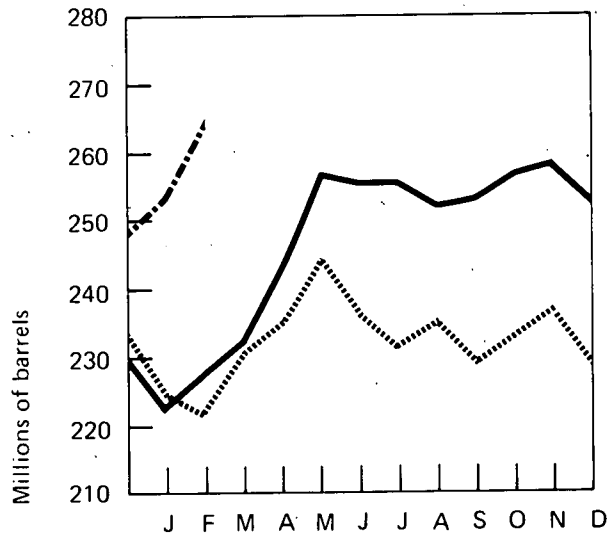
Domestic Production*



Imports*



Stocks*



1973
1974 BOM
1975 FEA

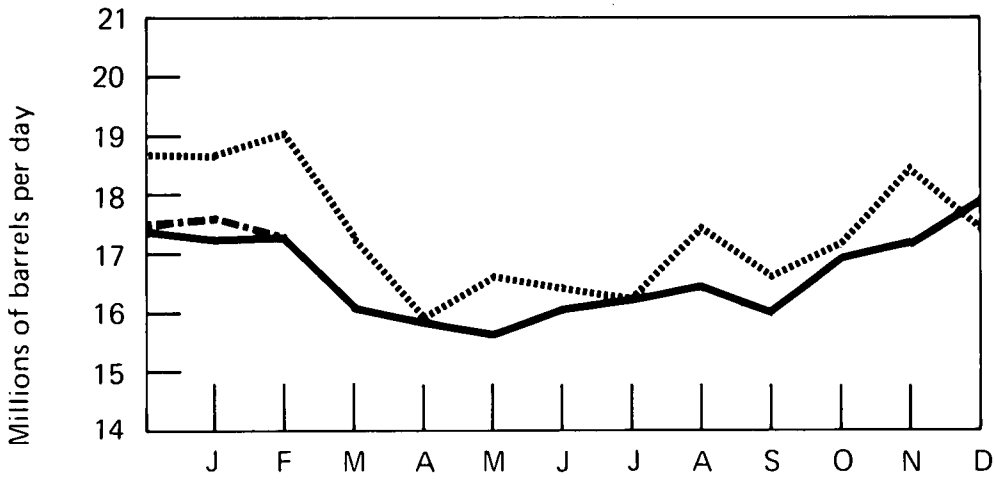
*See Explanatory Note 8.

Total Refined Petroleum Products

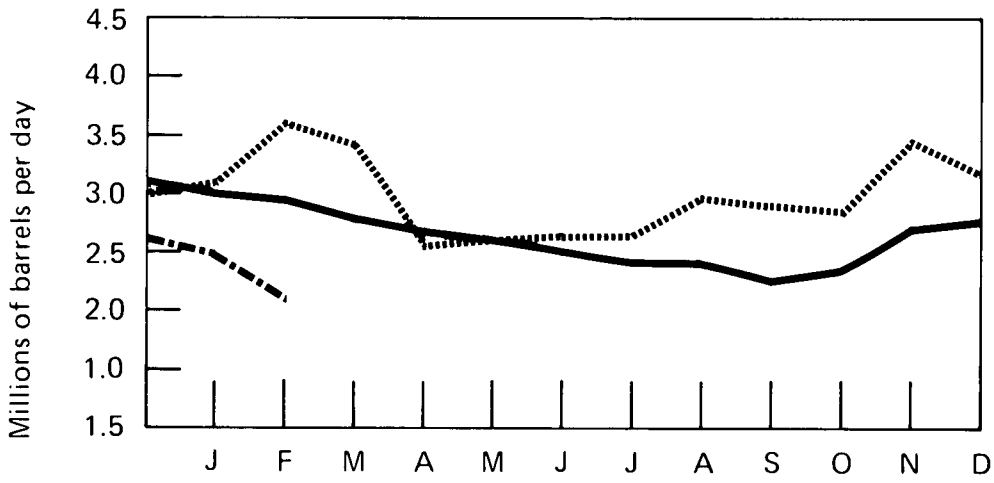
		Domestic Demand		Imports*	
		In thousands of barrels per day			
		BOM	FEA	BOM	FEA
1972	January	16,735		2,721	
	February	17,861		2,764	
	March	16,870		2,730	
	April	15,529		2,298	
	May	14,801		2,208	
	June	15,615		2,382	
	July	14,821		2,215	
	August	15,936		2,344	
	September	15,489		2,342	
	October	16,455		2,607	
	November	17,610		2,653	
	December	18,738		3,039	
1973	January	R18,713		R3,125	
	February	R19,094		R3,635	
	March	R17,216		R3,448	
	April	R15,921		R2,545	
	May	R16,626		R2,626	
	June	R16,481		R2,670	
	July	R16,372		R2,678	
	August	R17,499		R2,999	
	September	R16,656		R2,941	
	October	R17,202		R2,894	
	November	R18,492		R3,470	
	December	R17,538		R3,164	
1974	January	17,270		2,973	
	February	17,371		2,973	
	March	16,045		2,753	
	April	15,919		2,703	
	May	15,720	15,740	2,580	2,454
	June	16,176	16,191	2,493	2,218
	July	16,301	15,853	2,397	2,140
	August	16,546	15,803	2,434	2,281
	September	15,994	16,318	2,225	2,180
	October	17,025	17,121	2,340	2,361
	November	17,214	17,129	2,704	2,581
	December	17,997	17,588	2,781	2,638
1975	January		R17,581		2,486
	February		**17,295		**2,138

*See definitions. **Preliminary data. R=Revised data.
Sources: Bureau of Mines (BOM) and Federal Energy Administration (FEA) as indicated.

Domestic Demand*



Imports*



*See Explanatory Note 8.

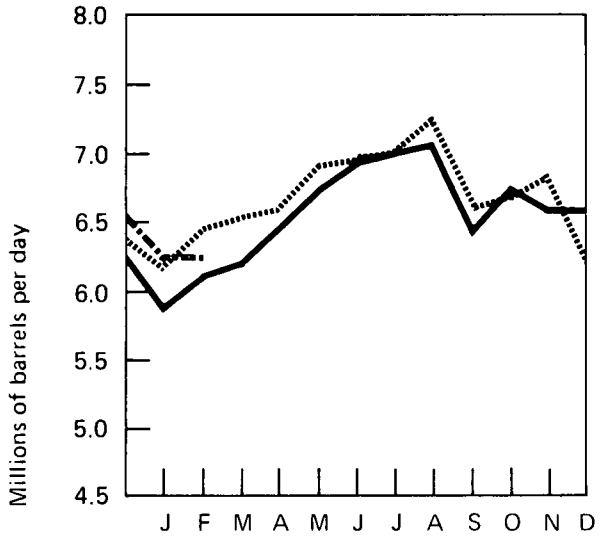
1973
1974 BOM
1975 FEA

Motor Gasoline

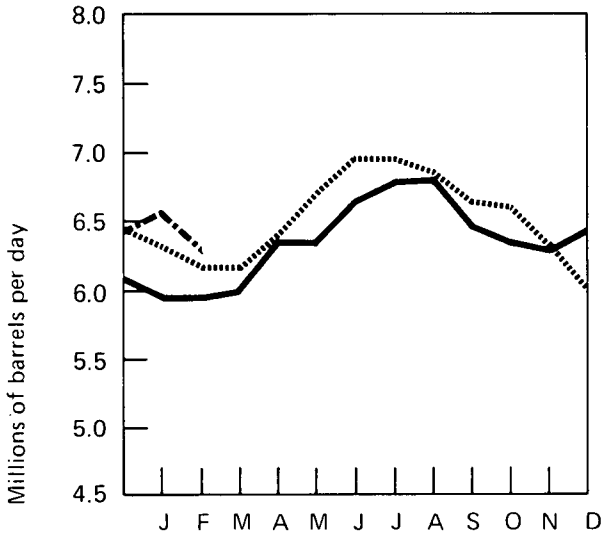
		Domestic Demand		Production*		Imports		Stocks*	
		In thousands of barrels per day						In thousands of barrels	
		BOM	FEA	BOM	FEA	BOM	FEA	BOM	FEA
1972	January	5,549		6,151		51		239,633	
	February	5,710		5,989		66		249,927	
	March	6,412		5,913		67		236,831	
	April	6,283		5,833		52		225,153	
	May	6,445		6,023		74		214,736	
	June	6,822		6,244		75		200,143	
	July	6,673		6,612		69		200,710	
	August	6,938		6,588		81		192,706	
	September	6,453		6,605		70		199,690	
	October	6,350		6,532		71		207,776	
	November	6,479		6,436		69		208,930	
	December	6,378		6,424		69		212,770	
1973	January	6,118		6,341		59		221,823	
	February	6,437		R6,855		95		216,367	
	March	6,513		6,150		71		207,581	
	April	6,541		6,377		63		204,708	
	May	6,907		6,714		R101		202,081	
	June	6,964		6,993		174		208,374	
	July	7,023		6,986		133		211,488	
	August	R7,257		6,880		R164		205,122	
	September	6,581		R6,619		127		210,278	
	October	6,677		6,621		194		214,525	
	November	6,823		6,375		216		207,343	
	December	R6,237		6,099		R202		209,395	
1974	January	5,804		5,900		163		217,463	
	February	6,100		5,969		184		219,058	
	March	6,162		5,982		225		220,307	
	April	6,457		6,311		260		223,752	
	May	6,745	6,406	6,328	6,301	250	228	218,670	229,878
	June	6,919	6,895	6,663	6,642	211	145	217,381	226,652
	July	6,959	6,941	6,792	6,835	212	122	218,838	227,195
	August	7,061	6,849	6,815	6,776	253	192	218,951	231,015
	September	6,388	6,652	6,453	6,485	202	140	227,031	230,181
	October	6,712	6,542	6,336	6,340	171	175	220,748	229,275
	November	6,547	6,659	6,292	6,257	174	264	218,385	225,226
	December	6,558	6,551	6,419	6,451	141	170	218,346	227,363
1975	January		6,228		R6,574		203		244,425
	February		**6,205		**6,279		**169		**251,189

*See definitions.
**Preliminary data.
R=Revised data.
Sources: Bureau of Mines (BOM) and Federal Energy Administration (FEA) as indicated.

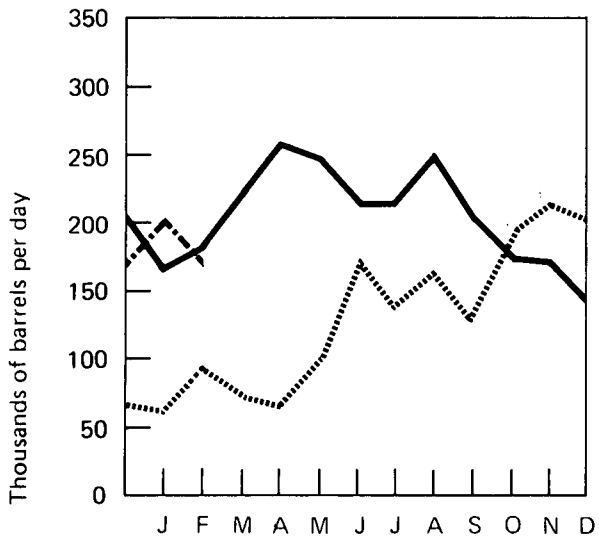
Domestic Demand*



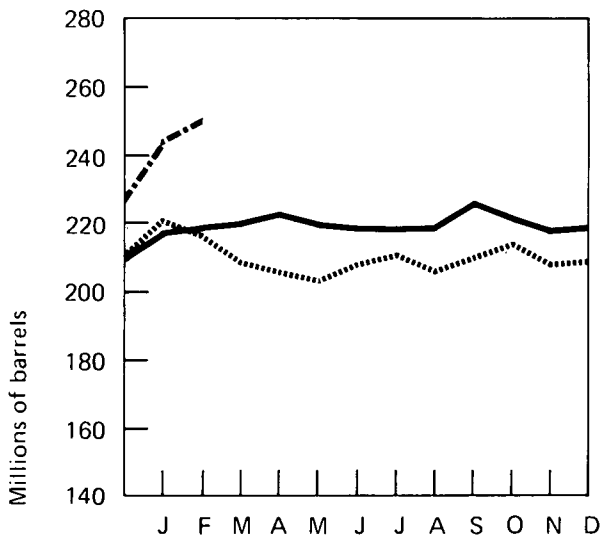
Production*



Imports*



Stocks*



*See Explanatory Note 8.

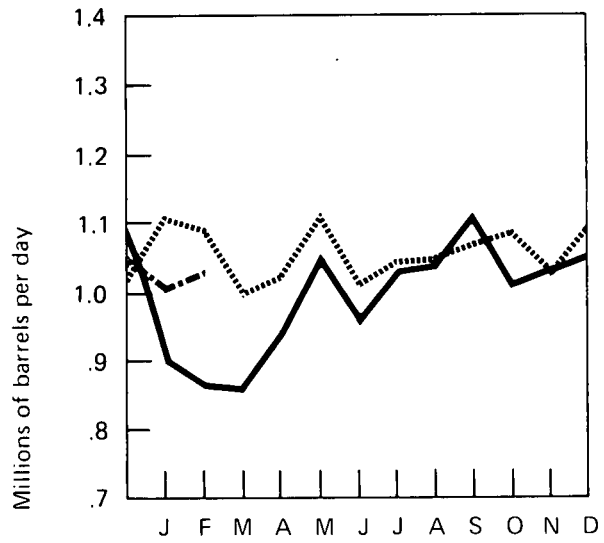
..... 1973
— 1974 BOM
-.- 1975 FEA

Jet Fuel

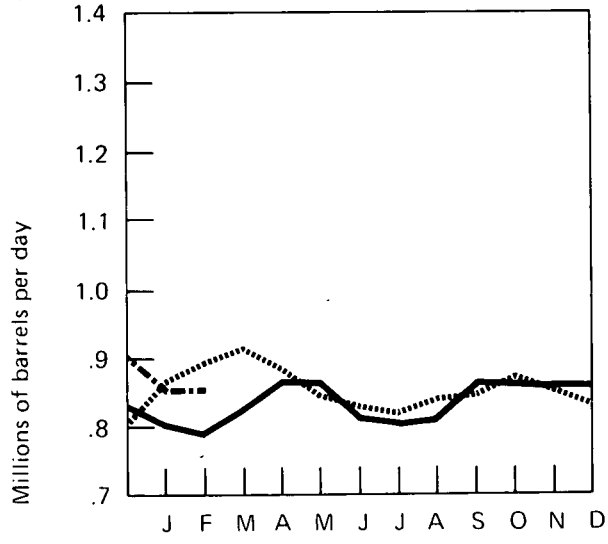
		Domestic Demand		Production		Imports		Stocks	
		In thousands of barrels per day						In thousands of barrels	
		BOM	FEA	BOM	FEA	BOM	FEA	BOM	FEA
1972	January	1,021		784		179		25,857	
	February	1,141		900		220		25,230	
	March	1,008		906		167		27,147	
	April	986		877		124		27,568	
	May	999		887		159		28,885	
	June	1,163		859		292		28,356	
	July	1,000		873		165		29,429	
	August	946		837		181		31,649	
	September	1,035		810		190		30,597	
	October	1,171		822		286		28,633	
	November	1,050		800		184		26,650	
	December	1,030		811		189		25,493	
1973	January	1,110		864		231		24,814	
	February	1,090		898		221		25,437	
	March	R 994		917		152		27,585	
	April	1,015		887		145		27,881	
	May	R1,112		840		211		25,825	
	June	1,007		836		R164		25,447	
	July	R1,046		825		R232		25,661	
	August	1,049		844		180		24,851	
	September	R1,070		847		R235		25,149	
	October	R1,104		875		R246		25,577	
	November	R1,025		852		R275		28,539	
	December	R1,087		830		R259		28,544	
1974	January	895		800		136		29,732	
	February	860		783		75		29,617	
	March	956		832		139		29,996	
	April	941		868		132		31,725	
	May	1,053	915	868	873	205	97	32,324	33,574
	June	952	1,016	810	886	141	115	32,200	33,128
	July	1,028	1,032	802	813	214	188	31,671	32,231
	August	1,031	1,076	805	849	206	202	30,989	31,594
	September	1,109	1,100	867	883	217	183	30,186	30,587
	October	1,011	1,092	868	905	161	216	30,564	31,488
	November	1,032	1,055	863	861	140	222	29,616	31,303
	December	1,043	1,138	861	908	178	219	29,435	30,957
1975	January		1,001		847		R164		31,221
	February		*1,031		*849		*166		*30,641

*Preliminary data.
R=Revised data.
Sources: Bureau of Mines (BOM) and Federal Energy Administration (FEA) as indicated.

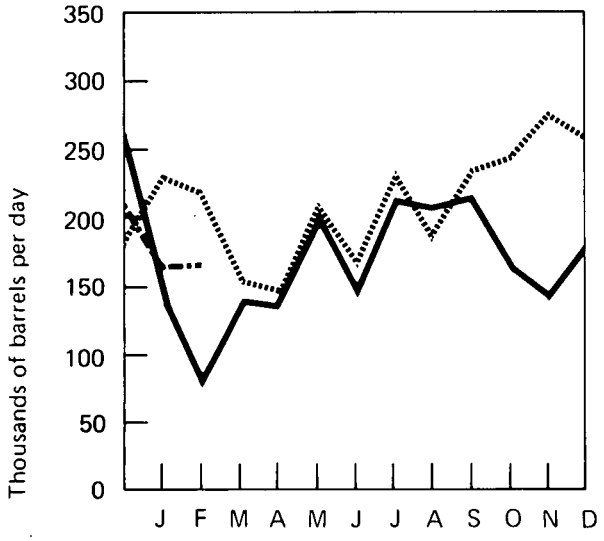
Domestic Demand*



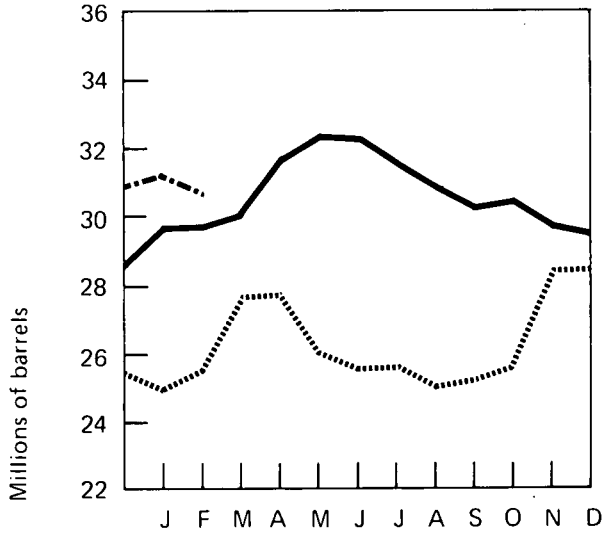
Production*



Imports*



Stocks*



..... 1973
— 1974 BOM
-.- 1975 FEA

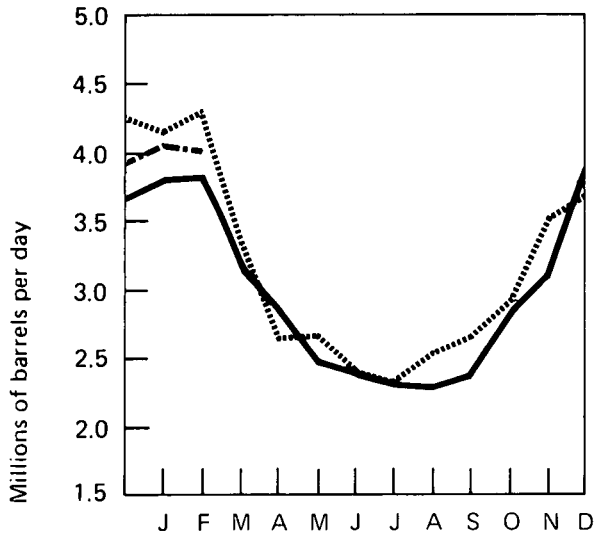
*See Explanatory Note 8.

Distillate Fuel Oil

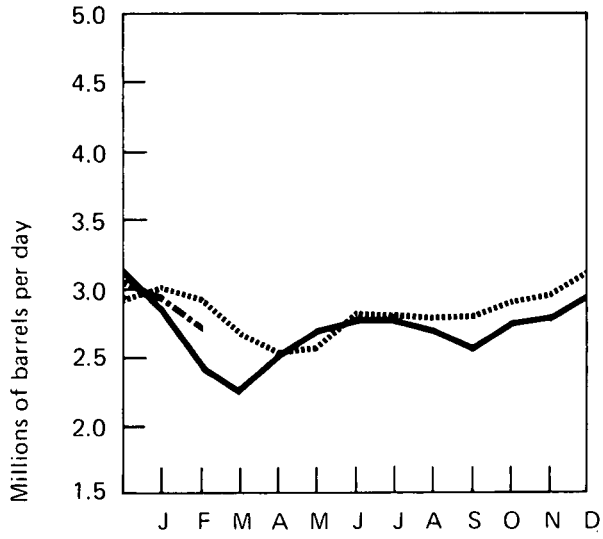
		Domestic Demand		Production*		Imports		Stocks*	
		In thousands of barrels per day						In thousands of barrels	
		BOM	FEA	BOM	FEA	BOM	FEA	BOM	FEA
1972	January	3,723		2,538		197		160,027	
	February	4,164		2,653		204		122,154	
	March	3,482		2,564		257		101,728	
	April	2,778		2,476		189		98,288	
	May	2,250		2,585		132		112,892	
	June	2,194		2,623		96		128,739	
	July	1,765		2,529		97		155,557	
	August	2,064		2,582		92		174,674	
	September	2,205		2,624		99		190,250	
	October	2,759		2,722		203		195,530	
	November	3,383		2,719		227		182,581	
	December	4,232		2,938		382		154,284	
1973	January	R4,138		3,028		R364		130,958	
	February	R4,302		2,937		R731		113,276	
	March	R3,337		2,667		R602		111,270	
	April	2,635		2,510		240		114,698	
	May	R2,673		2,544		R268		119,104	
	June	R2,419		2,825		R222		137,844	
	July	R2,328		2,752		R318		160,869	
	August	R2,555		2,801		R288		177,271	
	September	R2,675		2,813		R313		190,171	
	October	R2,930		2,911		R451		202,965	
	November	3,508		2,922		R492		200,182	
	December	R3,690		3,136		R439		196,421	
1974	January	3,820		2,880		449		181,179	
	February	3,835		2,399		293		149,125	
	March	3,145		2,226		267		128,822	
	April	2,848		2,522		216		125,553	
	May	2,453	2,616	2,704	2,741	271	288	141,806	151,345
	June	2,386	2,249	2,783	2,818	228	175	160,645	173,639
	July	2,302	2,251	2,792	2,881	214	168	182,458	198,374
	August	2,295	2,271	2,704	2,779	111	112	198,673	217,632
	September	2,377	2,473	2,551	2,655	144	143	208,269	227,069
	October	2,863	2,816	2,770	2,787	213	264	209,908	234,257
	November	3,145	3,058	2,801	2,883	443	403	212,875	241,125
	December	3,855	3,923	2,924	3,028	517	466	200,029	227,877
1975	January		R4,055		2,954		R350		R204,576
	February		**4,004		**2,708		**295		**176,530

*See definitions.
**Preliminary data.
R=Revised data.
Sources: Bureau of Mines (BOM) and Federal Energy Administration (FEA) as indicated.

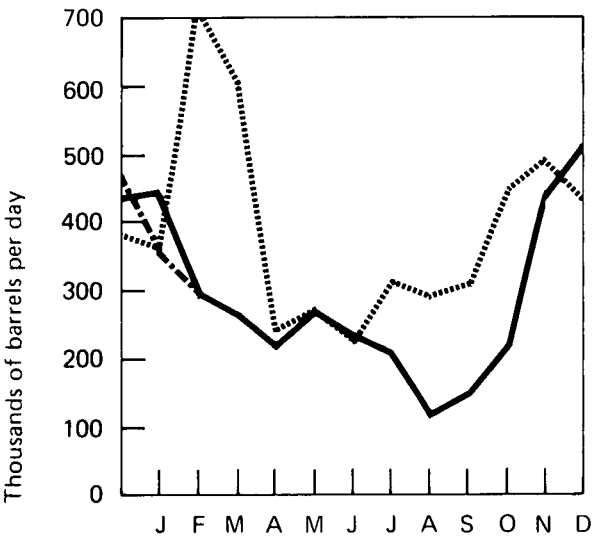
Domestic Demand*



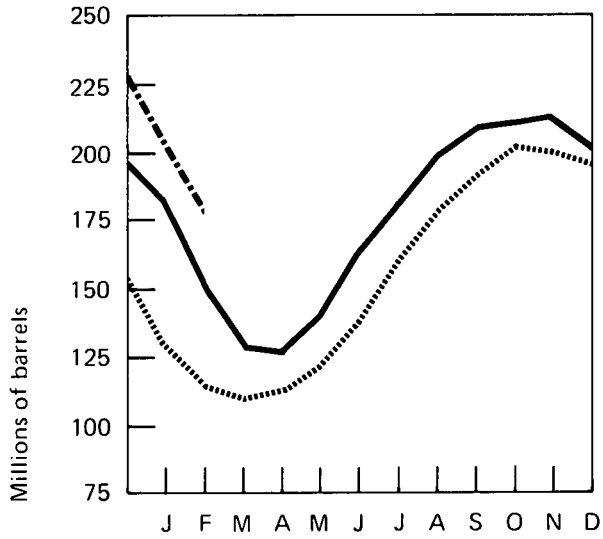
Production*



Imports*



Stocks*



*See Explanatory Note 8.

..... 1973
— 1974 BOM
-.- 1975 FEA

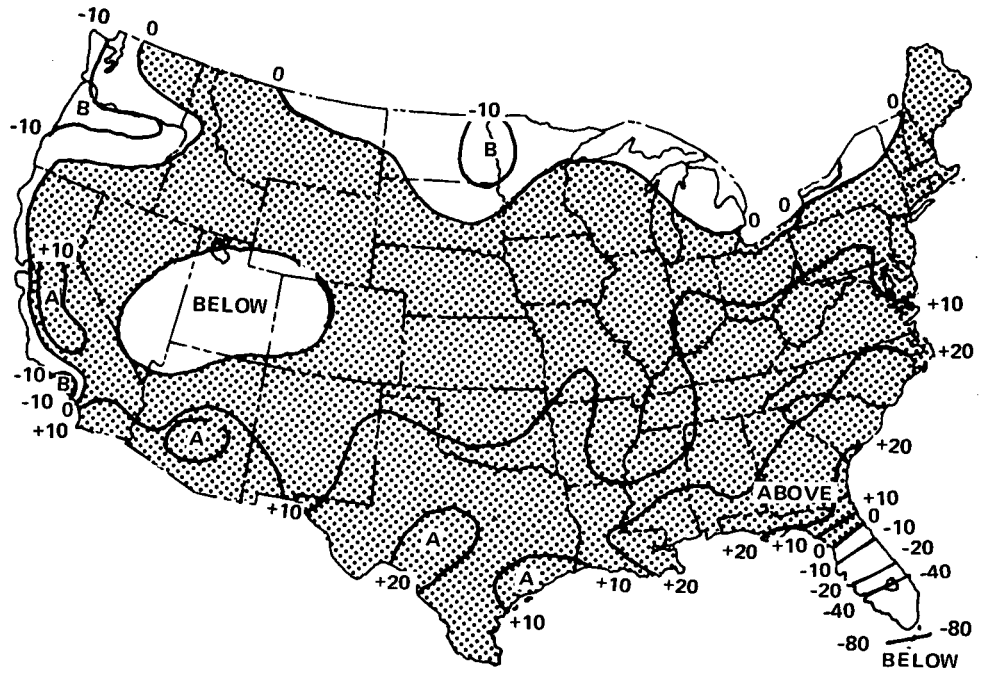
OIL HEATING DEGREE-DAYS*

Petroleum Administration for Defense (PAD) Districts	February (February 3 - March 2) 1975	1974**	Normal (1941-1970)**	Cumulative Since July 1, 1974 1974-75	1973-74**	Normal (1941-1970)**
PAD District I	747.6	822.5 (- 9.1)	821.9 (- 9.0)	3,313.0	3,218.2 (+ 2.9)	3,551.8 (- 6.7)
New England	964.5	1,018.8 (- 5.3)	1,023.1 (- 5.7)	4,283.7	4,167.1 (+ 2.8)	4,480.8 (- 4.4)
Conn., Maine, Mass., N.H., R.I., Vt.						
Middle Atlantic	856.2	948.7 (- 9.8)	933.5 (- 8.3)	3,744.3	3,703.1 (+ 1.1)	4,013.8 (- 6.7)
Del., Md., N.J., N.Y., Pa.						
Lower Atlantic	327.2	384.5 (-14.9)	409.6 (-20.1)	1,544.7	1,359.4 (+13.6)	1,758.4 (-12.2)
Fla., Ga., N.C., S.C., Va., W. Va.						
PAD District II	1,077.2	1,031.6 (+ 4.4)	1,061.9 (+ 1.4)	4,738.9	4,578.1 (+ 3.5)	4,831.9 (- 1.9)
Ill., Ind., Iowa, Kans., Ky., Mich., Minn., Mo., Nebr., N. Dak., Ohio, Okla., S. Dak., Tenn., Wis.						
PAD District III	394.2	374.1 (+ 5.4)	420.3 (- 6.2)	1,741.4	1,583.3 (+10.0)	1,906.9 (- 8.7)
Ala., Ark., La., Miss., N. Mex., Tex.						
PAD District IV	947.3	851.6 (+11.2)	921.5 (+ 2.8)	4,617.6	4,594.5 (+ 0.5)	4,754.2 (- 2.9)
Colo., Idaho, Mont., Utah, Wyo.						
PAD District V	570.4	535.6 (+ 6.5)	557.4 (+ 2.3)	2,816.7	2,885.8 (- 2.4)	3,055.5 (- 7.8)
Ariz., Calif., Nev., Oreg., Wash.						
U.S. Total	801.9	839.3 (- 4.4)	849.2 (- 5.6)	3,563.6	3,459.8 (+ 3.0)	3,765.8 (- 5.4)

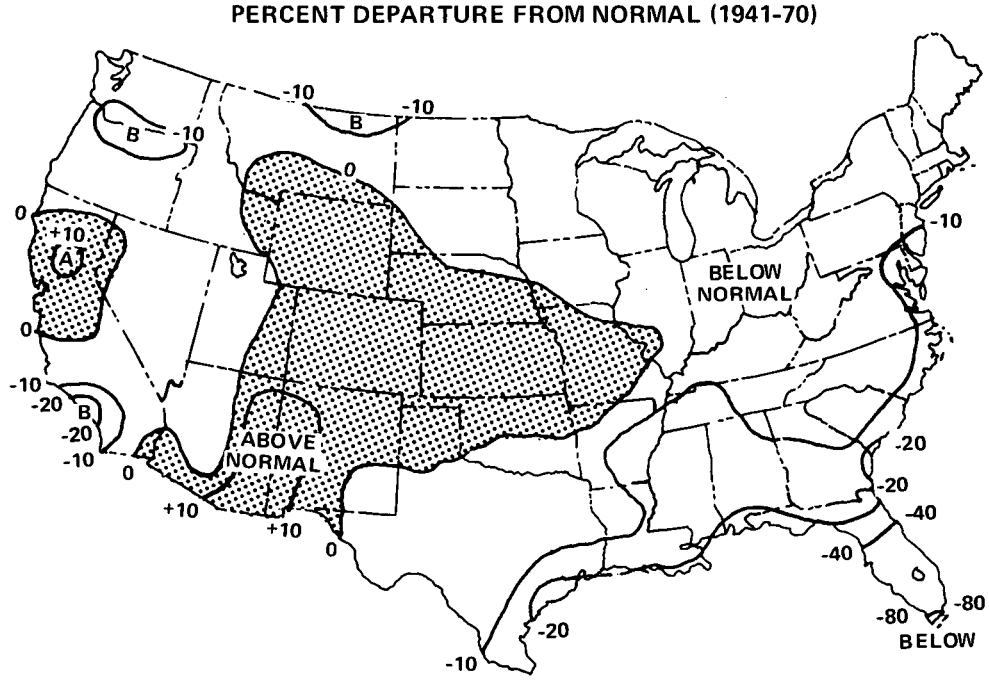
*See Explanatory Note 9 for explanation of oil heating degree-days.
**Percentage change in parenthesis.

HEATING DEGREE-DAYS ACCUMULATED FROM JULY 1, 1974 MARCH 2, 1975

PERCENT DEPARTURE FROM 1973-74



PERCENT DEPARTURE FROM NORMAL (1941-70)



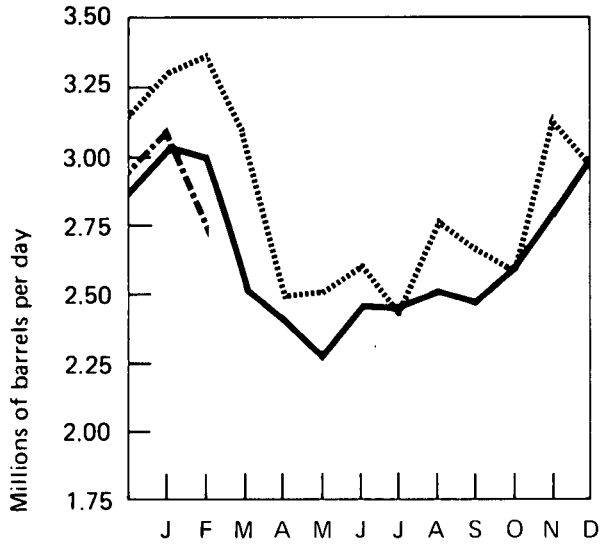
NOTE: Above normal heating degree-days correspond to below normal temperatures.
Source: Department of Commerce – NOAA.
Based on preliminary telegraphic reports.

Residual Fuel Oil

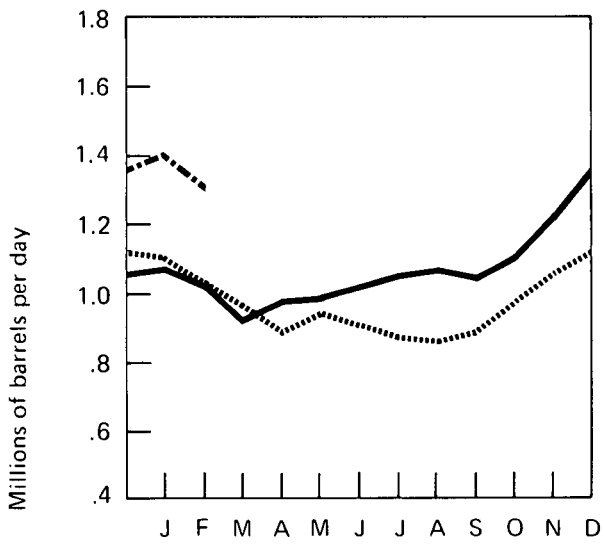
	Domestic Demand		Production		Imports		Stocks	
	In thousands of barrels per day						In thousands of barrels	
	BOM	FEA	BOM	FEA	BOM	FEA	BOM	FEA
1972 January	2,815		924		1,892		59,440	
February	3,171		963		1,923		50,891	
March	2,682		828		1,926		51,566	
April	2,444		739		1,676		49,425	
May	2,111		664		1,573		53,035	
June	2,196		661		1,649		56,109	
July	2,107		673		1,594		60,230	
August	2,257		674		1,653		61,399	
September	2,239		710		1,625		63,692	
October	2,362		745		1,655		63,758	
November	2,843		890		1,769		57,702	
December	3,151		1,124		1,968		55,216	
1973 January	R3,306		1,112		R2,019		49,154	
February	R3,382		1,038		R2,147		43,058	
March	R3,084		955		R2,196		44,711	
April	R2,477		877		R1,705		47,044	
May	R2,521		948		R1,668		49,207	
June	R2,607		915		R1,761		51,811	
July	R2,412		882		1,597		53,363	
August	R2,755		851		R1,913		53,586	
September	R2,676		878		R1,849		55,091	
October	R2,590		984		R1,597		54,964	
November	R3,158		1,061		R1,979		51,985	
December	R2,944		1,158		R1,826		53,480	
1974 January	3,035		1,072		1,732		46,548	
February	3,010		1,029		1,923		45,004	
March	2,516		912		1,674		47,222	
April	2,432		984		1,587		51,339	
May	2,251	2,111	995	992	1,353	1,250	54,356	64,548
June	2,455	2,177	1,026	1,058	1,549	1,260	57,891	68,646
July	2,432	2,135	1,056	1,091	1,433	1,197	59,787	73,066
August	2,539	2,368	1,067	1,126	1,530	1,342	60,988	76,011
September	2,454	2,419	1,032	1,070	1,400	1,274	60,251	72,723
October	2,610	2,501	1,099	1,112	1,464	1,369	58,679	72,090
November	2,819	2,631	1,229	1,226	1,636	1,453	60,363	73,581
December	2,965	2,881	1,335	1,350	1,612	1,561	59,694	74,521
1975 January		R3,103		R1,399		R1,529		68,628
February		*2,724		*1,304		*1,308		*65,076

*Preliminary data.
R = Revised data.
Sources: Bureau of Mines (BOM) and Federal Energy Administration (FEA) as indicated.

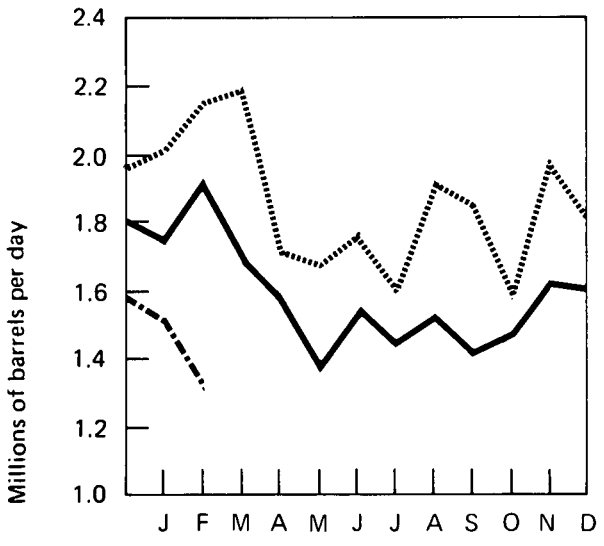
Domestic Demand*



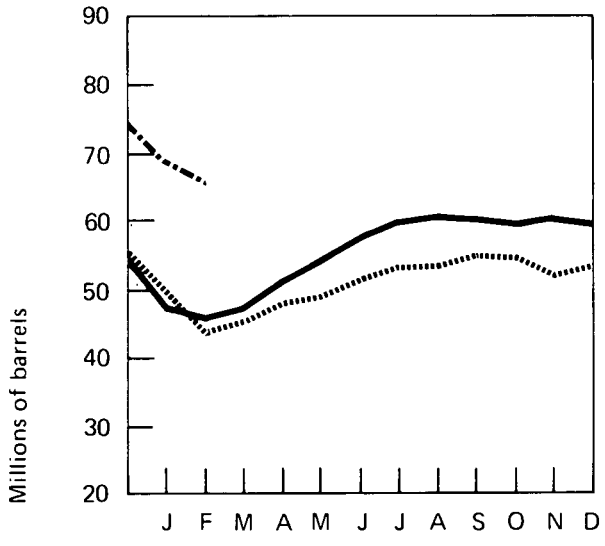
Production*



Imports*



Stocks*



*See Explanatory Note 8.

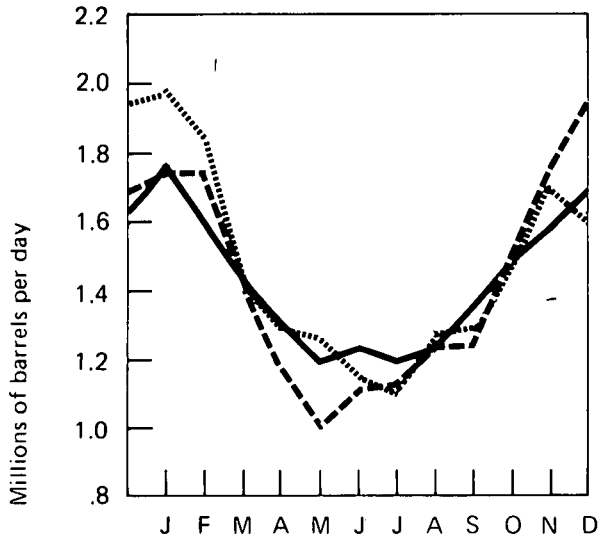
..... 1973
— 1974 BOM
-.- 1975 FEA

Natural Gas Liquids

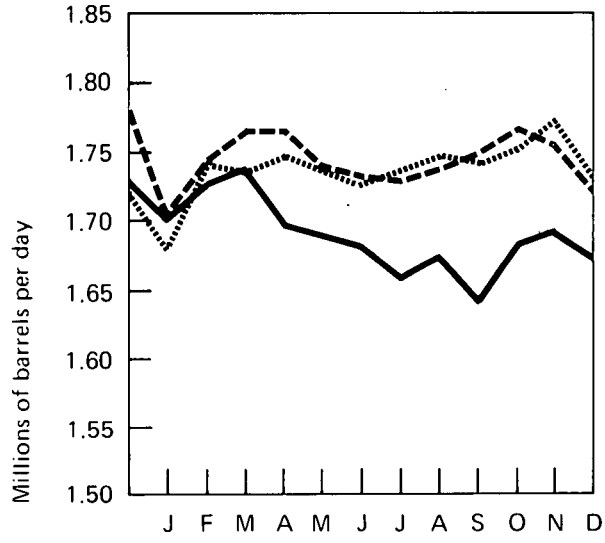
		Domestic Demand*	Production*	Imports	Stocks*
			In thousands of barrels per day		In thousands of barrels
1972	January	1,746	1,705	196	76,704
	February	1,752	1,747	182	68,232
	March	1,417	1,768	186	68,777
	April	1,181	1,769	118	75,101
	May	995	1,737	147	84,984
	June	1,114	1,734	134	92,831
	July	1,121	1,731	141	100,363
	August	1,243	1,739	164	104,397
	September	1,244	1,751	168	108,853
	October	1,525	1,769	202	105,098
	November	1,768	1,757	221	94,673
	December	1,946	1,721	231	79,238
1973	January	1,994	1,680	313	64,343
	February	1,857	1,745	312	55,997
	March	R1,407	1,734	R260	58,471
	April	R1,299	R1,750	R201	65,297
	May	R1,270	1,739	R216	73,942
	June	1,149	1,727	163	83,057
	July	R1,109	1,737	R199	93,362
	August	R1,281	1,748	R239	98,996
	September	R1,297	1,741	R206	103,907
	October	R1,499	1,756	R249	104,215
	November	R1,703	1,774	R286	98,320
	December	R1,607	1,729	R231	94,106
1974	January	1,779	1,699	305	85,820
	February	1,593	1,728	294	84,734
	March	1,408	1,741	224	89,362
	April	1,321	1,696	215	95,707
	May	1,181	1,689	182	104,739
	June	1,242	1,684	200	111,356
	July	1,187	1,657	163	118,804
	August	1,221	1,676	163	125,120
	September	1,359	1,638	167	126,454
	October	1,493	1,686	200	123,634
	November	1,596	1,694	199	118,026
	December	1,692	1,670	230	108,377
1975	January		**1,629		

*See Explanatory Note 10.
**Preliminary data.
Source: Bureau of Mines.

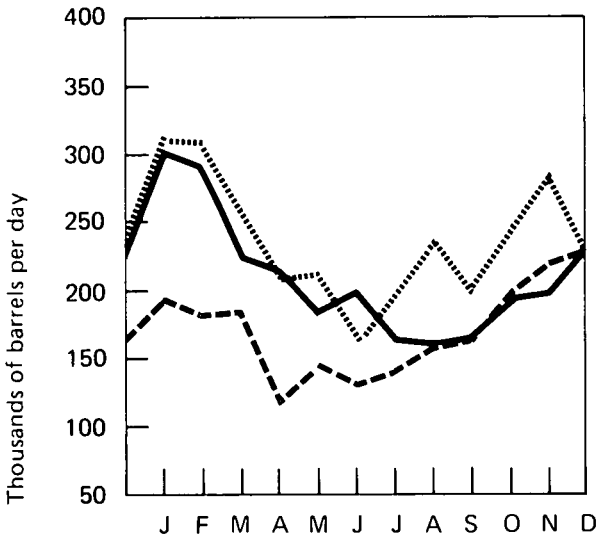
Domestic Demand



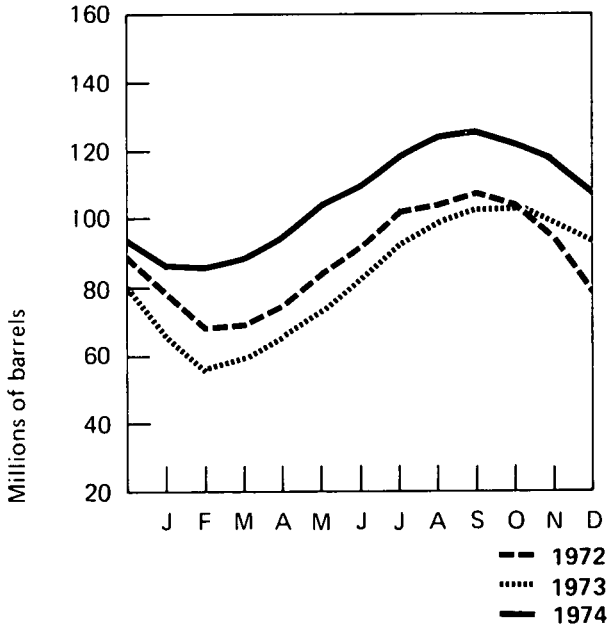
Production



Imports



Stocks

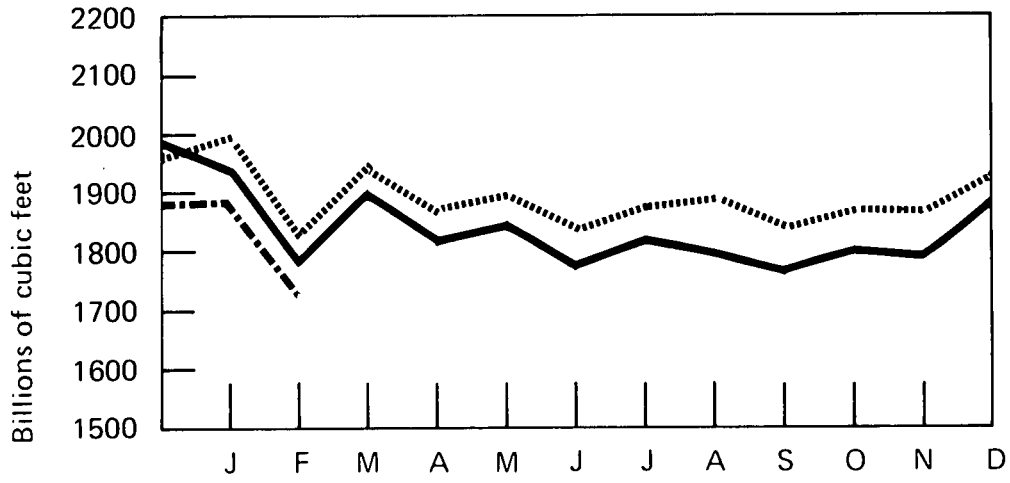


Natural Gas

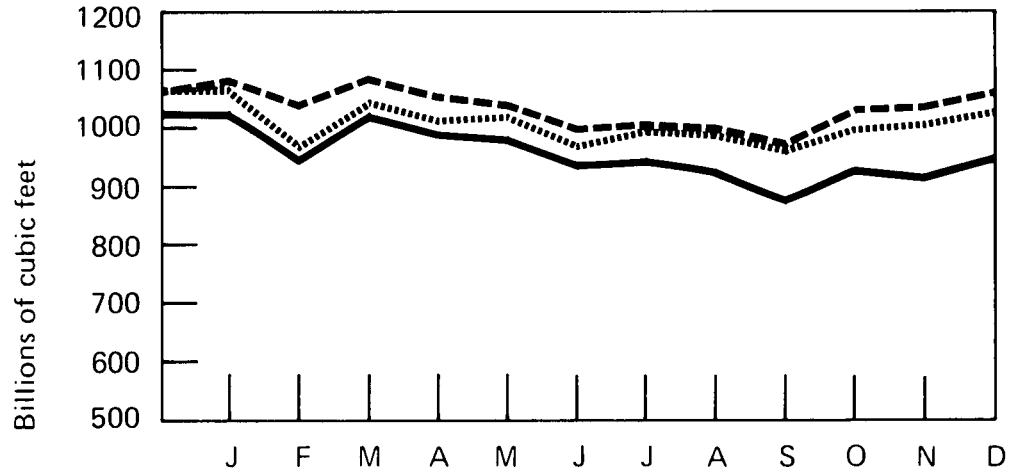
		Marketed Production	Domestic Producer Sales to Major Interstate Pipelines	Imports
			In billion cubic feet	
1972	January	1,994	1,086	117
	February	1,902	1,035	112
	March	1,937	1,091	88
	April	1,893	1,050	134
	May	1,867	1,045	111
	June	1,797	985	108
	July	1,837	1,013	102
	August	1,859	1,007	97
	September	1,854	970	114
	October	1,889	1,040	103
	November	1,896	1,041	111
	December	1,961	1,065	111
1973	January	1,994	1,069	93
	February	1,821	963	84
	March	1,952	1,052	91
	April	1,864	1,007	88
	May	1,898	1,026	86
	June	1,839	963	79
	July	1,880	999	80
	August	1,896	994	85
	September	1,840	956	82
	October	1,875	1,001	91
	November	1,863	1,000	85
	December	1,926	R1,038	89
1974	January	1,944	1,033	86
	February	1,773	941	79
	March	1,907	1,027	85
	April	1,812	987	83
	May	1,853	981	80
	June	1,777	928	74
	July	1,827	947	74
	August	1,797	932	76
	September	1,761	871	70
	October	R1,808	936	83
	November	*1,799	921	82
	December	**1,880	959	R87
1975	January	**1,890		**85
	February	**1,730		**78

*Preliminary data.
**Projected data.
R=Revised data.
Sources: Marketed Production and Imports—Bureau of Mines. Domestic Producer Sales—Federal Power Commission.

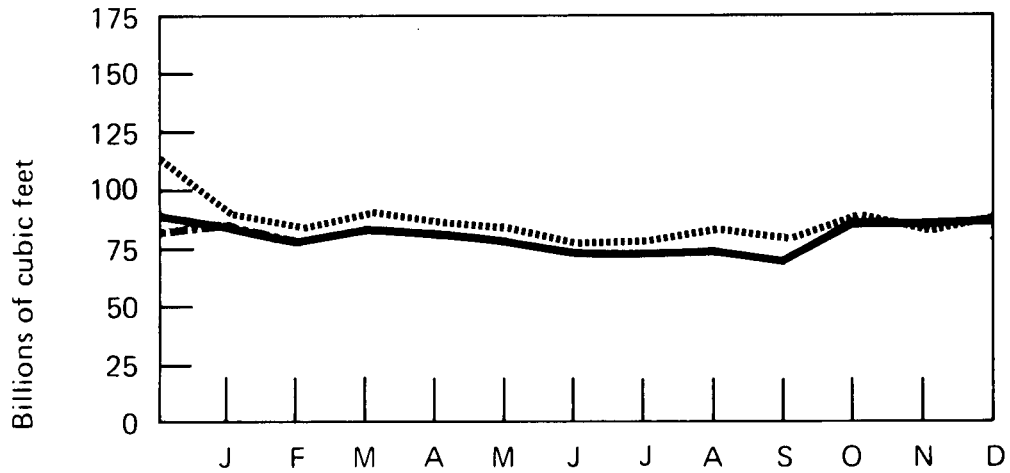
Marketed Production



Domestic Producer Sales to Major Interstate Pipelines



Imports



1972
1973
1974
1975

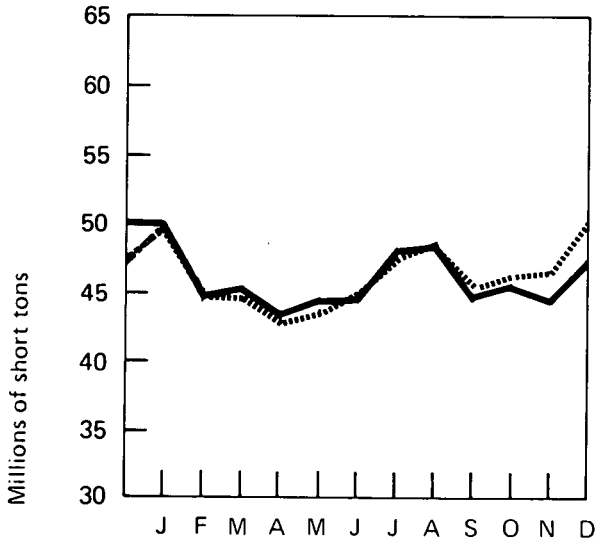
Coal

Bituminous and Lignite

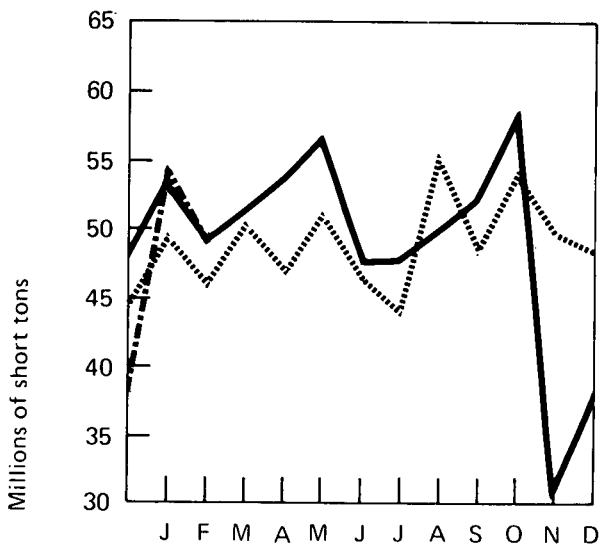
		Domestic Consumption*	Production**	Exports	Stocks
			In thousands of short tons		
1972	January	43,951	49,680	3,660	91,178
	February	43,178	49,112	3,630	92,183
	March	43,773	54,438	4,624	96,795
	April	40,158	49,814	4,915	102,981
	May	40,588	52,879	5,416	110,577
	June	40,505	50,083	4,882	115,723
	July	43,071	40,964	3,627	111,353
	August	44,698	52,169	6,337	114,665
	September	42,002	49,374	4,923	116,196
	October	43,050	51,671	5,210	120,135
	November	44,104	50,297	5,380	121,401
	December	47,698	44,904	3,392	117,442
1973	January	49,838	49,379	2,954	111,120
	February	44,652	45,893	2,669	108,870
	March	44,814	50,547	3,377	111,490
	April	42,689	46,999	5,063	112,585
	May	43,628	51,420	5,140	116,890
	June	45,115	46,613	4,969	109,960
	July	47,715	43,801	4,188	107,390
	August	48,840	55,874	5,133	106,910
	September	45,471	48,338	3,424	106,230
	October	46,427	54,382	5,882	107,490
	November	46,703	49,826	5,214	107,169
	December	50,130	48,666	4,889	R103,022
1974	January	R50,115	53,470	2,813	R 99,230
	February	R44,572	49,010	4,627	R 96,870
	March	R45,408	51,455	3,179	R 99,810
	April	R43,162	53,820	4,944	R106,490
	May	R44,612	57,135	6,032	R110,190
	June	R44,857	47,635	6,369	R112,030
	July	R48,187	47,855	5,307	R106,491
	August	R48,413	50,285	5,088	105,810
	September	R44,136	52,460	4,893	109,205
	October	R45,776	58,705	7,342	116,514
	November	44,589	30,865	6,744	108,710
	December	47,436	38,290	2,587	95,572
1975	January	49,940	54,885	4,254	94,696
	February		***49,035		

*See Explanatory Note 11.
**See Explanatory Note 12.
***Preliminary data.
R = Revised data.
Source: Bureau of Mines.

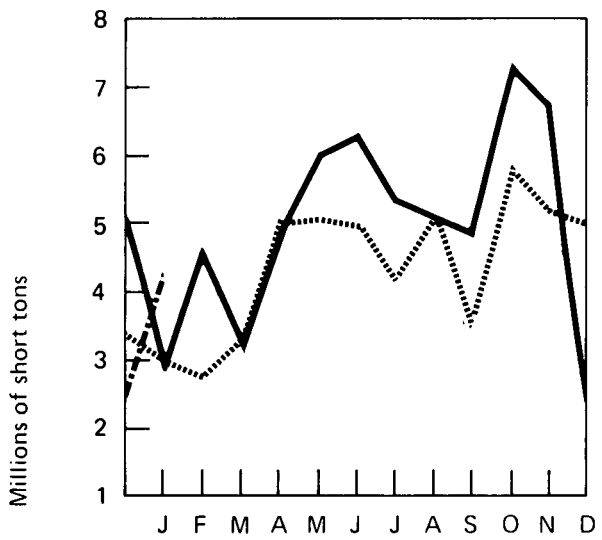
Domestic Consumption



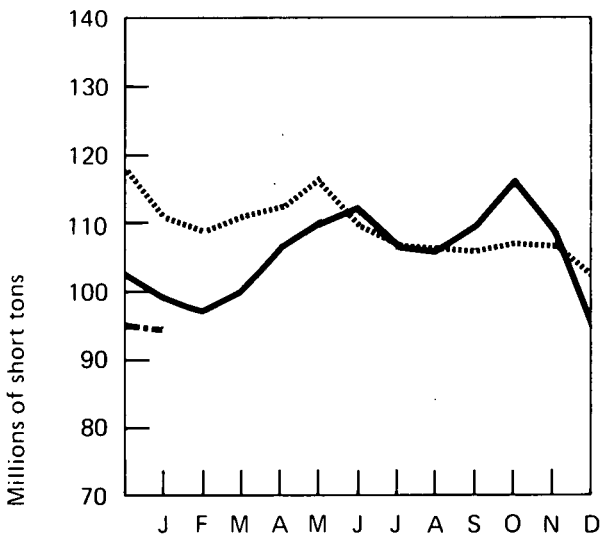
Production



Exports



Stocks



1973
1974
1975

Part 3

Electric Utilities

ELECTRIC UTILITIES

Utility production of electricity for the first 2 months of 1975 was 4.2 and 1.2 percent greater than the corresponding periods in 1974 and 1973, respectively.

Nuclear power and hydroelectric power continued to increase their shares of total electricity production, growing from 22.5 percent in December to 23.4 percent in January.

Natural gas consumption by electric utilities continued to decline; January 1975 usage was down 1.2 percent from December 1974 and 7.8 percent compared with January 1974.

Coal and oil consumption by electric utilities in January was essentially unchanged from the previous month; compared with January 1974, however, oil consumption was up by 15.9 percent.

Coal and oil stockpiles at powerplants in January were about the same as in December, representing a 72-day supply for coal and a 63-day supply for oil.

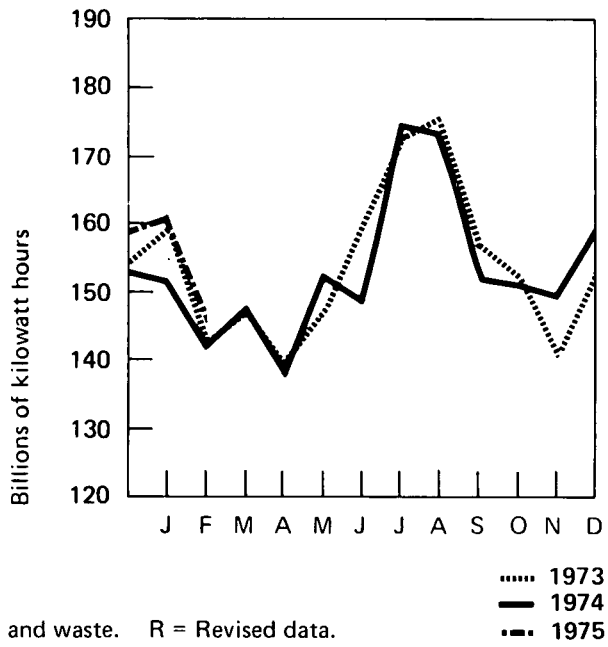
Kilowatt-hour sales to residential and commercial customers in December 1974 were up 17.8 and 2.5 percent, respectively, over the previous month.

Kilowatt-hour sales to industry during December were down 6.1 percent from the previous month.

Electric Utilities

		Total Production	Percentage Produced from Each Source					
		In millions of kilowatt hours	Coal	Oil	Gas	Nuclear	Hydro-electric	Other*
1972	January	144,575	45.4	17.9	16.6	2.9	16.9	0.3
	February	137,301	45.7	17.3	18.0	2.6	16.1	0.3
	March	140,056	44.3	15.2	20.0	3.0	17.2	0.3
	April	132,138	43.6	13.4	22.3	2.7	17.7	0.3
	May	137,745	43.3	12.7	24.0	2.1	17.6	0.3
	June	145,523	42.3	13.3	25.5	2.6	15.9	0.4
	July	157,846	42.1	14.1	25.7	2.9	14.9	0.3
	August	162,822	42.8	13.7	25.7	3.5	13.9	0.4
	September	147,358	43.4	14.7	25.5	3.2	12.9	0.3
	October	143,742	44.3	14.1	25.2	3.2	13.0	0.2
	November	143,867	45.7	18.3	17.2	3.7	14.8	0.3
	December	154,350	45.9	19.5	14.4	3.9	16.0	0.3
1973	January	159,320	47.2	19.3	13.1	3.9	15.8	0.7
	February	143,109	47.4	18.1	14.0	4.1	16.0	0.4
	March	147,754	45.6	16.2	16.2	4.5	17.2	0.3
	April	139,273	46.0	14.4	17.9	4.2	17.2	0.3
	May	147,021	44.2	14.6	20.2	3.8	16.8	0.4
	June	160,962	43.5	16.0	21.6	4.2	14.5	0.2
	July	172,539	44.1	16.5	22.5	4.0	12.7	0.2
	August	175,928	44.5	17.2	21.6	4.4	11.9	0.4
	September	156,304	45.6	17.2	21.0	4.9	11.0	0.3
	October	153,888	45.6	17.6	19.8	4.8	11.8	0.4
	November	140,785	47.3	16.6	16.5	5.7	13.5	0.4
	December	153,276	47.9	16.3	13.2	5.1	17.1	0.4
1974	January	152,226	48.2	17.1	13.5	4.9	15.9	0.4
	February	141,723	46.7	15.7	13.3	5.5	18.4	0.4
	March	148,046	45.3	14.7	15.6	5.5	18.5	0.4
	April	137,586	45.0	14.1	17.4	4.3	19.0	0.2
	May	153,076	44.3	14.7	18.4	4.0	18.3	0.3
	June	148,119	44.6	14.6	20.0	4.1	16.5	0.2
	July	175,057	43.0	15.4	21.1	5.5	14.6	0.4
	August	174,021	43.0	15.6	20.3	7.3	13.4	0.4
	September	151,963	43.5	16.1	19.1	7.1	14.0	0.2
	October	151,768	44.0	16.6	18.4	7.0	13.8	0.2
	November	149,504	45,0	18.4	15.2	7.1	14.2	0.1
	December	158,867	45.7	19.3	12.4	8.0	14.5	0.1
1975	January	R160,512	45.2	19.1	12.2	8.2	15.2	0.1
	February	145,692						

Total Production



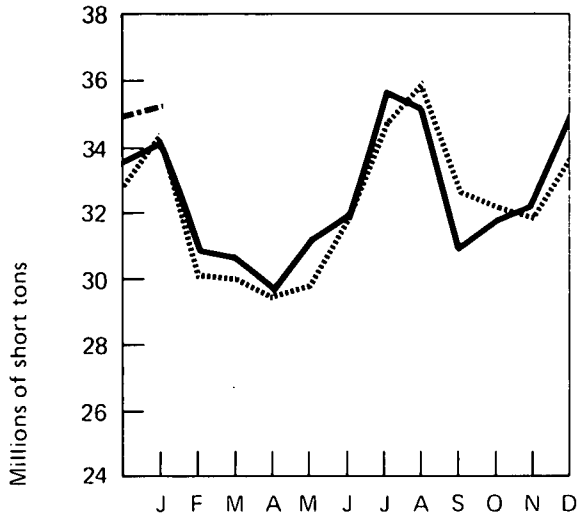
*Includes electricity produced from geothermal power, wood, and waste. R = Revised data.
Sources: Federal Power Commission.
Production data for latest month are from Edison Electric Institute.

Fuel Consumption

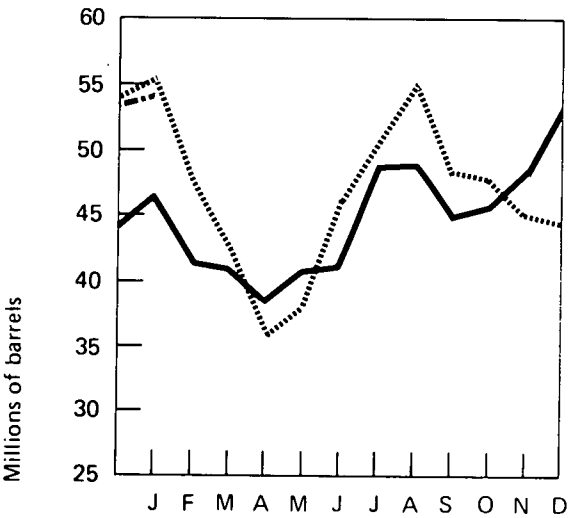
		Coal	Oil	Gas
		In thousands of short tons	In thousands of barrels	In millions of cubic feet
1972	January	30,231	46,555	251,029
	February	28,946	43,325	258,859
	March	28,472	38,809	294,804
	April	26,093	32,325	312,229
	May	26,823	32,106	351,543
	June	27,749	35,098	394,585
	July	30,214	40,646	433,533
	August	31,651	41,073	448,594
	September	28,988	38,723	398,799
	October	29,133	42,876	337,567
	November	29,926	47,914	262,447
	December	32,817	54,479	234,683
1973	January	34,591	55,773	219,270
	February	30,921	46,978	212,983
	March	30,746	42,701	255,314
	April	29,209	35,845	267,151
	May	29,683	38,097	316,989
	June	31,953	46,669	363,239
	July	34,833	50,956	414,408
	August	36,065	55,166	482,053
	September	32,723	47,937	418,776
	October	32,398	48,033	327,010
	November	31,856	45,158	247,038
	December	33,704	44,696	217,049
1974	January	34,468	46,700	222,080
	February	30,062	41,186	185,468
	March	31,135	40,007	244,288
	April	29,452	38,124	238,272
	May	31,341	41,046	304,166
	June	31,892	41,084	341,067
	July	35,809	48,909	399,259
	August	35,365	49,084	380,979
	September	30,965	44,791	320,978
	October	31,968	45,767	300,317
	November	32,208	48,542	240,471
	December	35,009	53,635	207,113
1975	January	35,238	54,144	204,688

Source: Federal Power Commission.

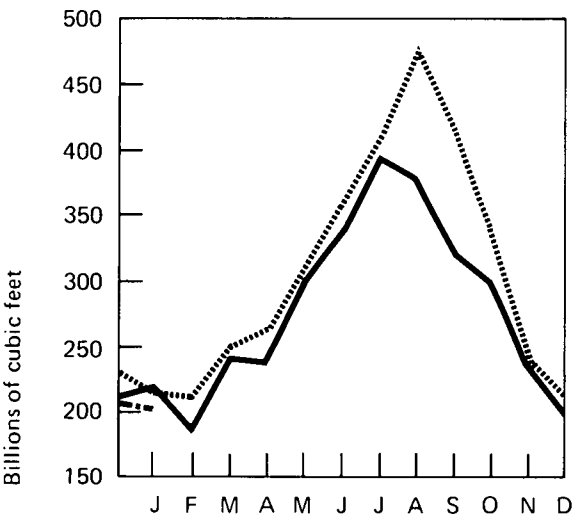
Coal Consumption



Oil Consumption



Gas Consumption



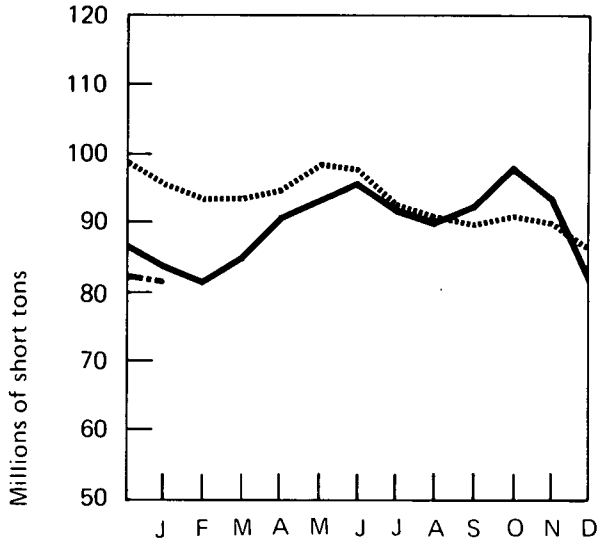
····· 1973
— 1974
-·- 1975

Electric Utilities (Continued)

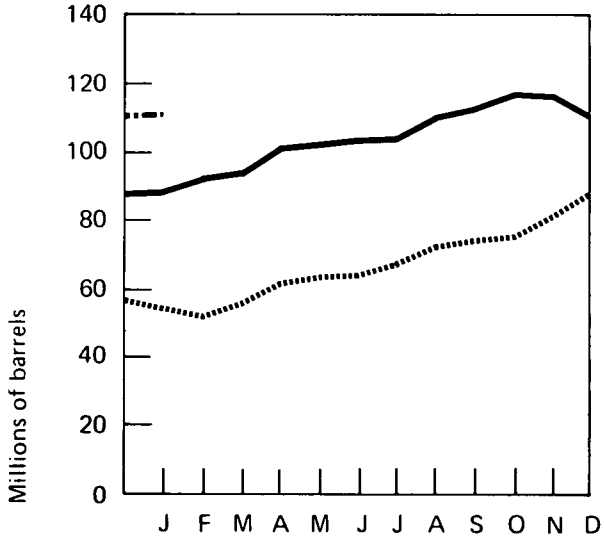
		Stocks at End of Month	
		Coal	Oil
		In thousands of short tons	In thousands of barrels
1972	January	76,876	46,055
	February	77,138	47,111
	March	80,296	52,213
	April	84,984	55,730
	May	91,778	57,399
	June	96,553	58,815
	July	93,760	60,786
	August	96,611	66,024
	September	98,396	66,004
	October	102,205	65,531
	November	102,477	62,067
	December	98,671	57,686
1973	January	95,017	53,691
	February	92,993	50,858
	March	93,986	54,885
	April	94,991	62,411
	May	98,722	64,259
	June	97,995	65,003
	July	92,215	67,987
	August	91,356	73,259
	September	90,156	74,863
	October	91,428	76,343
	November	90,369	81,224
	December	86,880	88,228
1974	January	83,366	89,053
	February	80,962	92,645
	March	84,257	94,187
	April	90,901	100,210
	May	93,628	103,606
	June	95,811	104,316
	July	91,616	105,919
	August	89,691	110,997
	September	92,704	113,570
	October	98,373	117,564
	November	93,825	116,558
	December	83,652	111,990
1975	January	81,429	110,304

Source: Federal Power Commission.

Coal Stocks



Oil Stocks

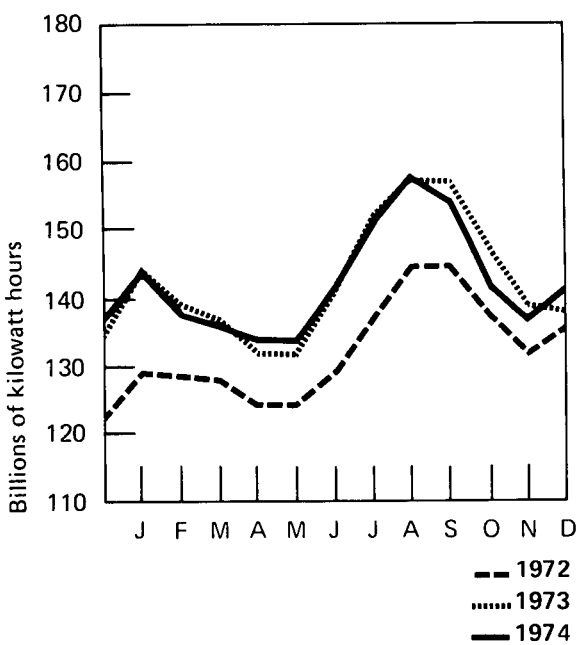


1973
1974
1975

Sales

		Residential	Commercial	Industrial	Other*	Total
		In millions of kilowatt hours				
1972	January	46,353	27,965	50,526	4,579	129,423
	February	45,652	27,921	50,552	4,619	128,744
	March	43,559	27,856	52,086	4,606	128,107
	April	40,460	27,765	51,992	4,422	124,639
	May	38,044	27,983	53,489	4,430	123,946
	June	41,213	30,257	53,673	4,469	129,612
	July	47,813	32,211	52,702	4,666	137,392
	August	51,463	33,535	55,023	4,723	144,744
	September	50,888	33,522	55,548	4,928	144,886
	October	44,352	31,068	56,213	4,823	136,456
	November	41,672	29,426	55,251	4,986	131,335
	December	47,139	29,764	53,923	5,060	135,886
1973	January	52,840	31,182	55,274	5,209	144,505
	February	49,601	30,445	54,591	4,909	139,546
	March	46,315	30,100	55,866	4,822	137,103
	April	41,821	29,038	55,937	4,571	131,367
	May	39,825	30,060	56,838	4,638	131,361
	June	44,967	33,194	57,368	4,764	140,293
	July	54,123	36,147	57,152	5,140	152,562
	August	56,742	36,820	58,865	5,054	157,481
	September	56,210	36,711	59,178	5,211	157,310
	October	47,207	33,289	60,514	5,032	146,042
	November	43,175	31,363	58,464	5,085	138,087
	December	46,442	29,788	56,190	4,896	137,316
1974	January	52,846	30,608	55,754	4,995	144,203
	February	47,832	29,542	54,978	4,708	137,060
	March	46,154	29,309	55,999	4,693	136,155
	April	43,294	28,986	56,497	4,610	133,387
	May	41,215	29,876	57,386	4,685	133,162
	June	46,596	32,800	58,077	4,641	142,114
	July	53,435	35,229	57,899	4,965	151,528
	August	56,558	36,414	59,803	5,069	157,844
	September	53,252	35,830	60,366	4,983	154,431
	October	44,177	32,112	60,053	4,792	141,134
	November	42,773	30,968	57,361	4,969	136,071
	December	50,368	31,757	53,878	4,974	140,977

Total Sales



*Includes street lighting and trolley cars.
Source: Federal Power Commission.

Part 4

Nuclear Power

NUCLEAR POWER

One plant came into full commercial operation during February, Duane Arnold (515 megawatts), located near Cedar Rapids, Iowa, and owned by the Iowa Electric Light and Power Company.

In February the United States produced 55.5 percent of the total nuclear power generated by non-Communist countries.

The average U.S. lightwater reactor had a capacity of 709 megawatts, more than twice the 334-megawatt capacity of the average foreign reactor.

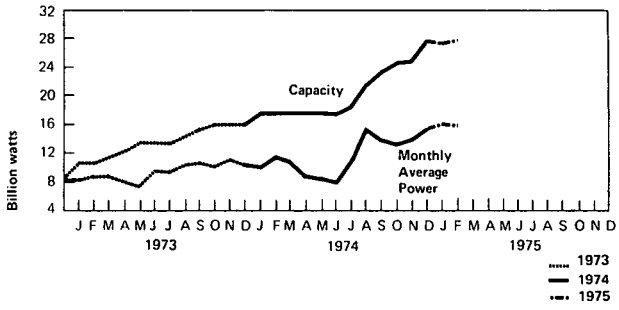
The U.S. capacity factor in February continued to be below the world average.

In January 1975 uranium mills were operating at only one-third of full capacity.

73.4 percent of enrichment production in February was for foreign customers.

U.S. Nuclear Powerplant Operations

		Capacity	Monthly Average Power	Percent of Total Domestic Electricity Generation
		In megawatts		
1972	January	7,349	5,720	2.9
	February	7,349	5,165	2.6
	March	7,349	5,750	3.0
	April	7,349	5,124	2.7
	May	7,349	3,918	2.1
	June	7,349	5,375	2.6
	July	7,349	6,227	2.9
	August	8,149	7,742	3.5
	September	8,149	6,589	3.2
	October	8,149	6,539	3.2
	November	8,149	7,475	3.7
	December	8,653	8,125	3.9
1973	January	10,901	8,395	3.9
	February	10,901	8,821	4.1
	March	11,701	8,991	4.5
	April	12,501	8,161	4.2
	May	13,769	7,657	3.8
	June	13,769	9,429	4.2
	July	13,769	9,355	4.0
	August	14,640	10,463	4.4
	September	15,513	10,815	4.9
	October	16,179	10,036	4.8
	November	16,179	11,308	5.7
	December	16,179	10,543	5.1
1974	January	17,734	10,230	4.9
	February	17,734	11,744	5.5
	March	17,734	11,015	5.5
	April	17,734	8,746	4.3
	May	17,734	8,254	4.0
	June	17,710	8,223	4.0
	July	18,722	11,321	4.8
	August	21,571	15,605	6.7
	September	23,667	13,894	6.6
	October	24,736	13,515	6.7
	November	24,934	14,080	6.8
	December	27,966	15,509	7.6
1975	January	27,424	16,072	7.4
	February	27,944	16,036	7.4



Sources: Capacity data and Monthly Average Power data for June 1974 forward are from U.S. Nuclear Regulatory Commission. Monthly Average Power data before June 1974 and Percent of Total Domestic Generation data are from Federal Power Commission.

Commercial Nuclear Power Generation by Major Non-Communist Countries—February 1975

Country	Number of Reactors	Capacity	Generation For Month	Capacity Factor 1975	Capacity Factor 1974
		In gross electrical magawatts	In billions of Kilowatt hours	In percent	
Canada	5	2,380	1.12	70	74
Federal Republic of Germany	7	3,450	1.52	65	57
France	10	3,050	1.63	79	57
Great Britain	29	6,140	2.81	68	61
India	3	620	0.21	51	55
Italy	3	630	0.35	83	61
Japan	8	3,890	0.98	38	61
Spain	3	1,120	0.65	87	75
Sweden	4	2,710	0.76	42	20
Switzerland	3	1,050	0.70	99	76
United States	50	35,430	13.40	56	57
Total	125	60,470	24.13	59	58

Source: Nucleonics Week Magazine.

Uranium Enrichment—February 1975

	United States	Foreign	Total
Separative Work Performed (in metric tons of separative work units)	100.31	277.06	377.37
Cost (in millions of dollars)	4.311	12.285	16.597
Product Quantity (in metric tons of uranium)	33.51	97.89	131.40
Average Enrichment (in percent U-235)	2.354	2.300	2.314
Feed Requirement (in metric tons of uranium)	141.24	402.39	543.63

Source: U.S. Energy Research and Development Administration.

FUEL CYCLE ACTIVITY	PRODUCT	QUANTITY				COST
		Processed Material*	Percent Utilization of Industry Capacity	Energy Content of Processed Material**	Energy Consumed in Fuel Cycle Activity***	Contribution to Electric Power+
		In MTU except where noted		In billion Btu except where noted		In mills per kilowatt hour
Milling	Yellowcake (U_3O_8) Deliveries	371	33	130,000	243	0.54
Conversion	Uranium Hexafluoride (UF_6) Deliveries	1,099	75	375,000	236	0.07
Enrichment	Enriched UF Delivered[6]	147 (590 MT-SWU)	++	301,000	17,151	0.86
Fabrication	Uranium Dioxide (UO_2) in Fuel Assemblies	150	61	307,000	95	0.46
	Unused UO_2 at Reactor Sites	30	–	–	–	–
Powerplant Operation	Electricity Generated	12,568 (Thousand MWhe)	59	–	610,000 (MWhe)	–
	Spent Fuel Discharged	0	–	–	–	–
Reprocessor	Spent Fuel Received	236	–	–	–	–
	Spent Fuel Reprocessed	0	–	–	–	–

*Units of measure are discussed in Explanatory Notes 3 and 4.
**Assumes 25,000 MWD/MTU for heat content of enriched uranium and a 6:1 feed-to-product ratio at the enrichment plant.
***Energy requirements for processing obtained from U.S.A.E.C. Report No. WASH-1148.
+Cost contribution is computed from unit prices paid for current month's production and requirement for a 1000-Mwe reactor operating at 80 percent capacity factor, given in AEC Report No. WASH 1174-74. Because of the long lead times required for nuclear fuel processing, the sum of the numbers in this column does not necessarily reflect the fuel cost of current electricity production.
++ERDA's enrichment plants are presently operating at maximum utilization of available electric power with the excess production being placed in the "preproduction stockpile" in anticipation of high demand for enrichment in the 1980's.
Source: FEA.

Part 5 Consumption

ENERGY CONSUMPTION

Domestic energy consumption in December 1974 was 6.741 quadrillion Btu.

For 1974, total consumption, at 73.386 quadrillion Btu, was 1.7 percent below the 1973 level of 74.647 quadrillion Btu.

1.768 quadrillion Btu were expended to generate and transmit electricity in December. For the year, 20.518 quadrillion Btu were expended in this manner.

Energy consumption by the Residential and Commercial Sector was 2.426 quadrillion Btu in December 1974; 30.9 percent was consumed in the form of dry natural gas, 23.7 percent was petroleum products, and 44.2 percent was in the form of electricity. During 1974, this sector consumed 25.702 quadrillion Btu.

The Industrial Sector consumed 2.657 quadrillion Btu during December 1974, 44.3 percent of which was dry natural gas, 19.7 percent was in the form of petroleum products, 10.5 percent was in the form of coal, and 25.4 percent was in the form of electricity. For the year, this sector consumed a total of 28.942 quadrillion Btu.

The Transportation Sector consumed 1.658 quadrillion Btu in December, almost all of which was petroleum products (94.6 percent). In 1974, a total of 18.742 quadrillion Btu was consumed by the Transportation Sector.

FORECAST PETROLEUM CONSUMPTION

Total demand for petroleum products during the 4 weeks ending March 14 was 17.18 million barrels per day, which was 70,000 barrels per day below the forecast of 17.25 million barrels per day.

Domestic demand for motor gasoline for the 4 weeks ending March 14 was 6.45 million barrels per day, which was 190,000 barrels per day above the forecast level of 6.26 million barrels per day.

Domestic demand for distillate fuel oil for the 4 weeks ending March 14 was 3.71 million barrels per day, essentially equal to the forecast of 3.70 million barrels per day.

Domestic demand for residual fuel oil for the 4 weeks ending March 14 was 2.60 million barrels per day, which was 107,000 barrels per day above the forecast of 2.50 million barrels per day.

Economic Sector Energy Consumption by Primary Source for December 1974 and January-December 1974[1] [Quadrillion (10^{15}) Btu]

Sector	Primary Energy Source					Primary Energy Consumption	Electricity Distributed[6]	Net Energy Consumption	Electrical Energy Loss Distributed[7]	Ultimate Energy Disposition
	Coal[2]	Natural Gas (dry)[3]	Petroleum[4]	Hydroelectric[5]	Nuclear[5]					
Residential and Commercial										
December	0.029	0.750	0.574	–	–	1.353	0.292	1.645	0.781	2.426
Cumulative	0.268	7.068	6.325	–	–	13.661	3.420	17.081	8.621	25.702
Industrial										
December	0.279	1.176	0.523	0.003	–	1.981	0.184	2.165	0.492	2.657
Cumulative	3.800	11.073	5.768	0.035	–	20.676	2.348	23.024	5.918	28.942
Transportation										
December	[8]	0.070	1.569	–	[8]	1.639	0.005	1.644	0.014	1.658
Cumulative	0.007	0.658	17.866	–	[8]	18.531	0.060	18.591	0.151	18.742
Electric Utilities										
December	0.831	0.214	0.337	0.251	0.135	1.768	–	–	–	–
Cumulative	9.261	3.489	3.388	3.215	1.165	20.518	–	–	–	–
TOTALS										
December	1.139	2.210	3.003	0.254	0.135	6.741	0.481	5.454	1.287	6.741
Cumulative	13.336	22.288	33.347	3.250	1.165	73.386	5.828	58.696	14.690	73.386

[1] Cumulative data reflect revisions for previous months.

[2] Data are from Bureau of Mines. Includes anthracite and bituminous coal and lignite.

[3] Aggregate data are from Bureau of Mines. FPC provided data on natural gas consumed by electric utilities. The remainder is distributed to each economic sector using the following percentage shares, derived from 1974 Bureau of Mines data on consumption: Residential and Commercial - 37.6%; Industrial - 58.9%; Transportation - 3.5%.

[4] Aggregate petroleum data are from the Federal Energy Administration (November and December) and Bureau of Mines (January through October). FPC provided data on oil consumed by electric utilities. Petroleum consumed in transportation was calculated based on Department of Transportation data as follows: Motor gasoline - 100%; naphtha jet fuel - 100%; kerosine jet fuel - 97%; distillate fuel oil - 30.3%; residual fuel oil - 11.2%; all other products - 4.7%. The remainder is distributed to economic sectors using the following percentage shares, derived from 1974 Bureau of Mines data on consumption: Residential and Commercial - 52.3%; Industrial - 47.7%.

[5] Net imports of electricity from Canada, estimated at .012 quadrillion Btu/month, were assumed to be from hydroelectric power sources. Monthly industrial hydropower consumption is estimated to be one-twelfth of the preliminary Bureau of Mines annual figure for 1973.

[6] Electricity was distributed using FPC and Edison Electric Institute data on kilowatt-hour sales to ultimate customers. Electrical energy consumed by railroads and for street and highway lighting was distributed to the Transportation sector. All other sales, largely for use in government buildings, were distributed to the Residential and Commercial sector.

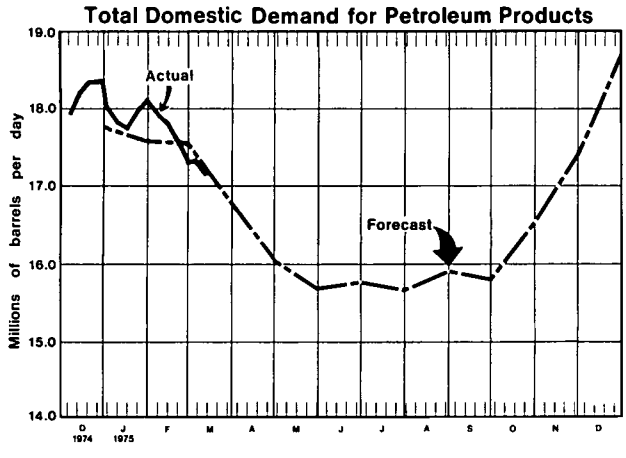
[7] In generating electricity with nuclear or fossil fuels, approximately 65 percent of the energy is lost in the form of heat. Transmission and distribution losses consume about an additional 3 percent of the energy inputs to the utility industry. In order to fully account for all energy consumed both directly and indirectly (i.e., ultimate energy disposition), the electricity losses are allocated to the final end use sectors in proportion to their direct kilowatt-hour usage.

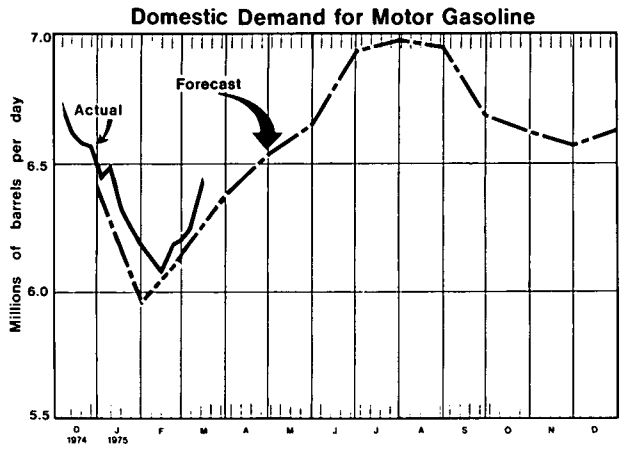
[8] Negligible.

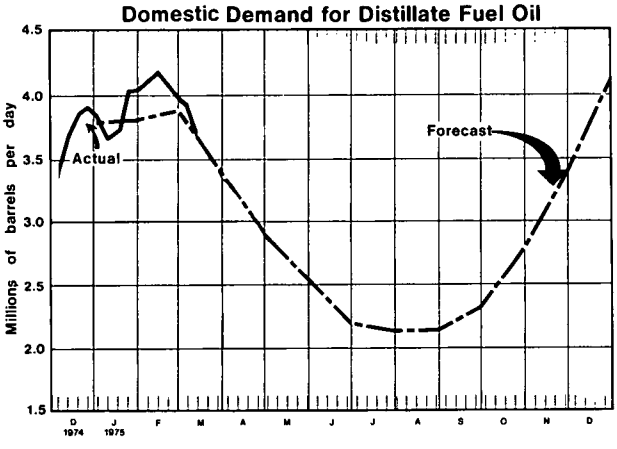
Percent Changes in Energy Consumption for December 1974 by Source (Quadrillion Btu)

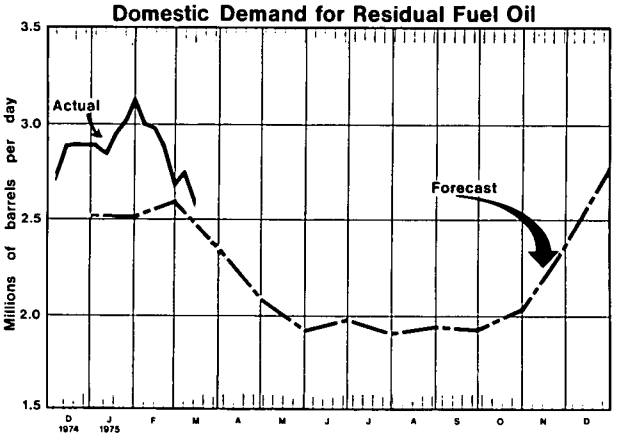
	December 1974 Consumption	Percent Change from December 1973	Cumulative Percent Change from January-December 1973 to January-December 1974
Refined Petroleum Products	3.003	+0.9	−3.9
Motor Gasoline	1.066	+5.3	−1.9
Jet Fuel	0.198	+9.6	−4.5
Distillate	0.708	+6.3	−4.6
Residual	0.561	−1.0	−6.9
Other Petroleum Products	0.470	−13.4	−4.0
Natural Gas (Dry)	2.210	−1.7	−2.0
Coal (Anthracite, bituminous, lignite)	1.139	−5.2	−0.1
Electricity (Sales)	0.481	+2.7	−0.3

Forecast Petroleum Consumption









Key

Domestic Demand — Demand for products, in terms of real consumption, is not available; production plus imports plus withdrawals from primary stocks is used as a proxy for consumption. Secondary stocks, not measured by FEA, are substantial for some products.

Actuals — Four-week moving averages.

Forecast — Forecast petroleum product demand assumes normal weather conditions and projected economic activity. The forecast is periodically revised to take into account actual weather conditions and revised macroeconomic forecasts. A more thorough description of FEA's forecasting procedures will appear in next month's issue.

Part 6

Resource Development

OIL AND GAS EXPLORATION

An average of 1,611 rotary rigs were engaged in oil and gas drilling operations during February 1975, an increase of 256 rigs, or 19 percent, over the rig count for February 1974.

There were 196 more oil wells, but 142 fewer gas wells, drilled in February 1975 compared with February 1974. Total wells drilled (oil + gas + dry holes) for the month, at 2,488, represented an increase of 7 percent over last February.

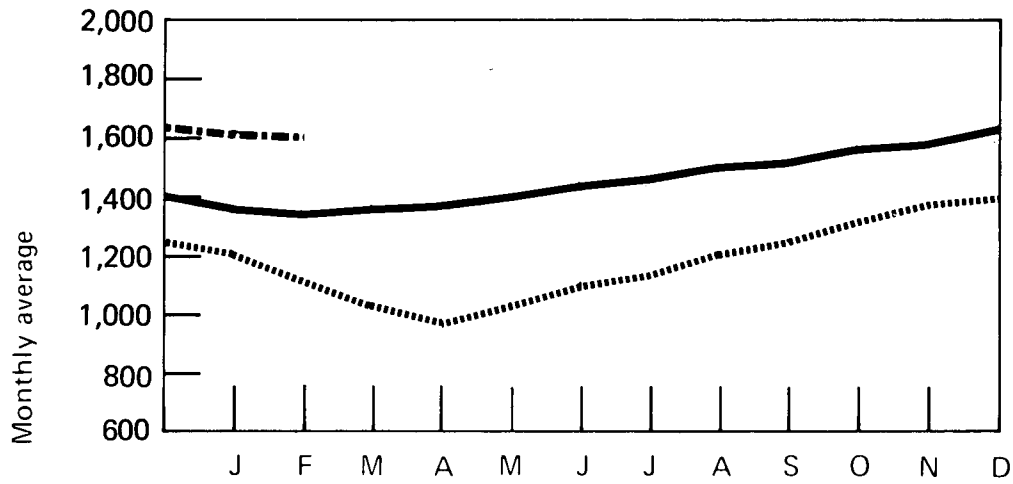
The number of seismic crews engaged in offshore oil and gas exploration declined to 24 in February 1975 from an average of 35 to 40 in operation during mid-1974. Four additional onshore crews were activated during February, however, for a total crew count of 302 for the month.

Oil and Gas Exploration

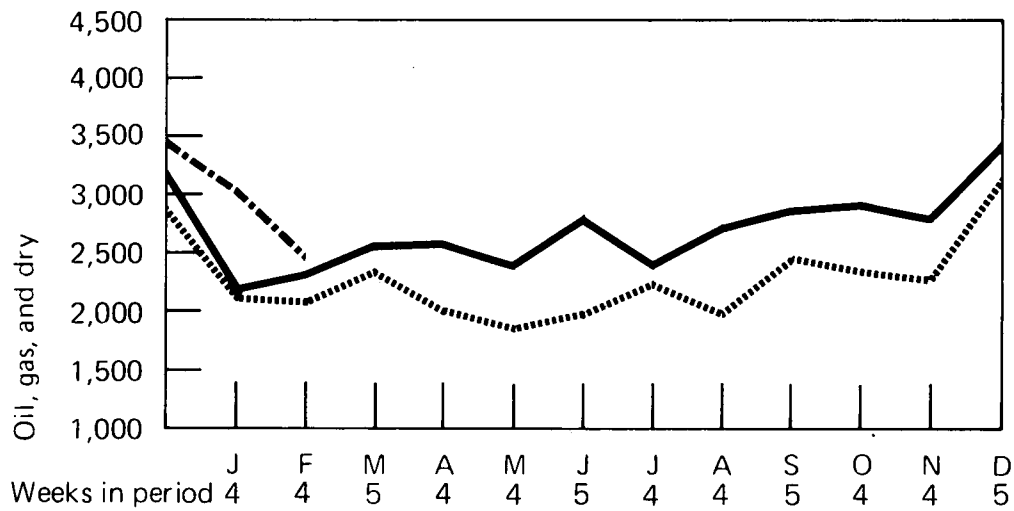
		Rotary Rigs in Operation	Wells Drilled				Total Footage of Wells Drilled
		Monthly average	Oil	Gas	Dry	Total	
1972	January	1,147	807	281	851	1,939	9,441,238
	February	1,071	965	350	955	2,270	12,381,669
	March	1,034	1,210	394	889	2,493	12,406,433
	April	1,002	923	355	788	2,066	9,902,253
	May	1,005	920	332	816	2,068	10,218,488
	June	1,049	1,042	395	903	2,340	11,009,513
	July	1,104	833	335	795	1,963	9,212,931
	August	1,130	946	410	924	2,280	11,334,867
	September	1,152	1,065	468	1,009	2,542	11,634,026
	October	1,165	792	539	919	2,250	10,944,312
	November	1,186	860	535	975	2,370	12,360,912
	December	1,241	985	536	1,290	2,811	14,190,138
1973	January	1,219	758	406	899	2,063	10,972,665
	February	1,126	777	487	765	2,029	10,655,936
	March	1,049	953	504	909	2,366	12,317,756
	April	993	699	489	777	1,965	10,433,987
	May	1,046	749	407	647	1,803	9,622,110
	June	1,118	767	432	795	1,994	10,814,600
	July	1,155	912	504	840	2,256	10,995,939
	August	1,222	724	456	739	1,919	9,632,819
	September	1,266	854	690	940	2,484	12,075,280
	October	1,334	790	554	958	2,302	11,693,672
	November	1,390	822	606	865	2,293	11,823,350
	December	1,405	1,087	827	1,208	3,122	15,529,582
1974	January	1,372	763	577	803	2,143	10,391,797
	February	1,355	901	600	816	2,317	12,160,308
	March	1,367	936	638	1,003	2,577	12,844,135
	April	1,381	947	700	945	2,592	13,349,007
	May	1,412	957	520	870	2,347	11,459,595
	June	1,432	1,238	586	982	2,806	12,976,388
	July	1,480	1,008	461	884	2,353	11,801,777
	August	1,518	1,210	555	968	2,733	12,409,855
	September	1,527	1,200	600	1,091	2,891	12,676,090
	October	1,584	1,131	551	1,241	2,923	14,080,534
	November	1,596	1,088	626	1,053	2,767	11,794,937
	December	1,643	1,339	791	1,274	3,404	15,707,092
1975	January	1,615	1,299	655	1,040	2,994	13,189,222
	February	1,611	1,097	458	933	2,488	12,070,712

Sources: Rotary Rigs - Hughes Tool Company.
Wells - American Petroleum Institute.

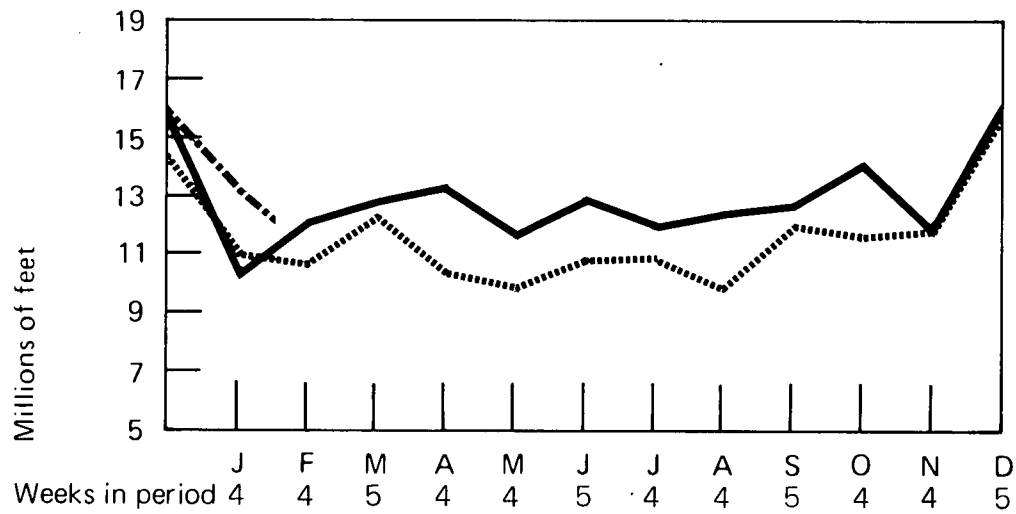
Rotary Rigs in Operation



Total Wells Drilled



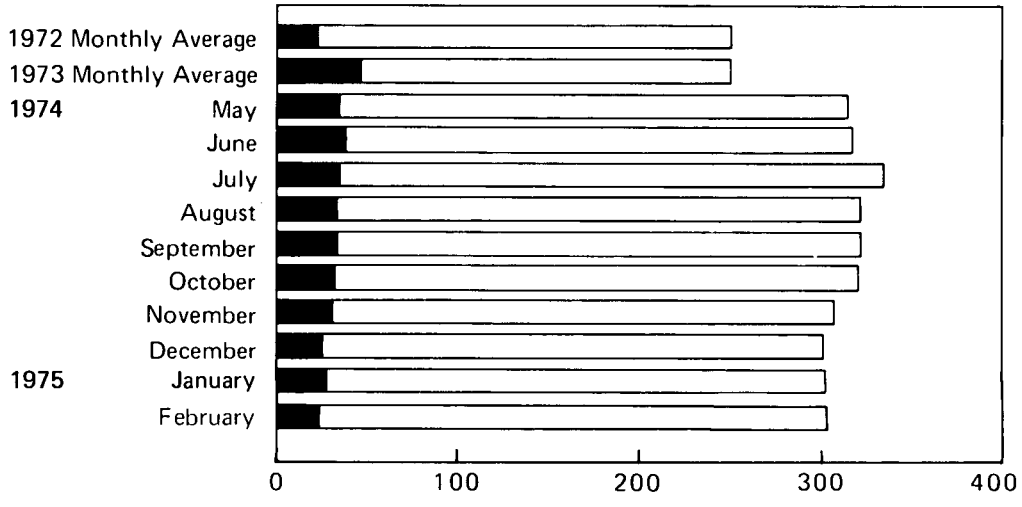
Total Footage of Wells Drilled



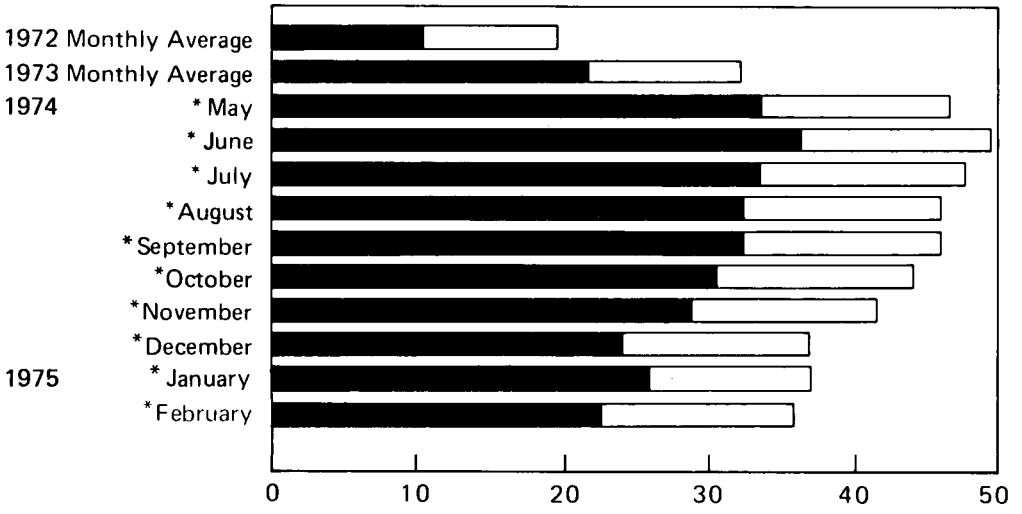
1973
1974
1975

	Crews Engaged in Seismic Exploration			Line Miles of Seismic Exploration		
	Offshore	Onshore	Total	Offshore	Onshore	Total
1972 Monthly Average	12	239	251	10,306	9,333	19,639
1973 Monthly Average	23	227	250	21,579	10,597	32,175
1974					Estimates*	
May	35	278	313	33,320	13,066	46,386
June	38	279	317	36,176	13,113	49,289
July	35	299	334	33,320	14,053	47,373
August	34	287	321	32,368	13,489	45,857
September	34	287	321	32,368	13,489	45,857
October	32	288	320	30,464	13,586	44,000
November	30	276	306	28,564	12,972	41,532
December	25	275	300	23,800	12,925	36,725
1975						
January	27	274	301	25,704	12,878	38,582
February	24	278	302	22,848	13,066	35,914

Crews Engaged in Seismic Exploration



Line Miles of Seismic Exploration



Thousands of miles

*See Explanatory Note 13. Source: Society of Exploration Geophysicists.

MOTOR GASOLINE

The average nationwide retail price of regular gasoline remained relatively stable during February, increasing only 0.1 cent to 52.5 cents per gallon. The average price that retailers paid for regular gasoline also increased 0.1 cent per gallon (for the third consecutive month) bringing this price to 43.5 cents per gallon.

During February, the average nationwide selling price of regular gasoline by major retail gasoline dealers was 4.3 cents per gallon greater than that of independents, a drop of 0.2 cent per gallon from January.

The national average price of diesel fuel sold in truck stops during February was 49.7 cents per gallon, compared with an average price of 50.2 cents per gallon for diesel fuel sold in retail gasoline service stations.

Regional gasoline prices ranged from a low of 50.6 cents per gallon in the Gulf Coast Region to 54.2 cents per gallon in the Mid-Atlantic Region.

A survey druing February of 21 major oil companies indicated that eight of the Nation's largest marketers of gasoline increased prices and only two decreased prices.

For these 21 companies, the average DTW price to branded retail outlets increased 0.29 cent per gallon from its January level. The average price paid by branded jobbers rose 0.28 cent per gallon, resulting in an increase of 0.01 cent per gallon on their margins.

HEATING OIL

Heating oil distributors decreased prices of heating oil sold to residential customers by 0.1 cent per gallon during January, which reflected an ample supply of heating oil on the market.

A survey of 21 major oil companies indicated that heating oil prices remained relatively unchanged during February. A total of 4 companies decreased prices, 4 increased prices, and 13 did not change prices.

CRUDE OIL

New and released oil accounted for 14 and 8 percent, respectively, of total domestic crude oil production during December. Production of old oil declined 1 percentage point to 66 percent. Stripper well production accounted for the remaining 12 percent.

The average wellhead price of new oil in January increased 20 cents per barrel to $11.28 per barrel.

The preliminary cost of imported crude petroleum to refiners decreased 19 cents per barrel in January.

The preliminary average cost of domestic crude to the refiner rose a substantial 31 cents per barrel in January to $7.70 per barrel.

The preliminary composite cost of crude oil to refiners during January was $9.56 per barrel, and increase of 28 cents per barrel over December.

UTILITY FOSSIL FUELS

The national average cost of fossil fuels delivered to utilities during the month increased a substantial 13.6 cents per million Btu over the October level. On a percentage basis, this was the largest monthly increase (13.9 percent) since January 1974. The Middle Atlantic and Pacific Regions exhibited the largest fuel cost increases at 31.6 cents and 24.9 cents per million Btu, respectively.

The national average cost of coal increased more in November than in any month during 1974 (9.4 cents per million Btu). Regionally, the largest increase occurred in the East North Central Region (15.5 cents per million Btu) which depends heavily upon coal as a utility fuel.

November residual fuel prices remained relatively stable compared with the previous month, rising only 0.7 cent per million Btu. The largest gain (11.2 cents per million Btu) occurred in the West North Central Region, and the greatest decline (6.3 cents per million Btu) was in the West South Central Region.

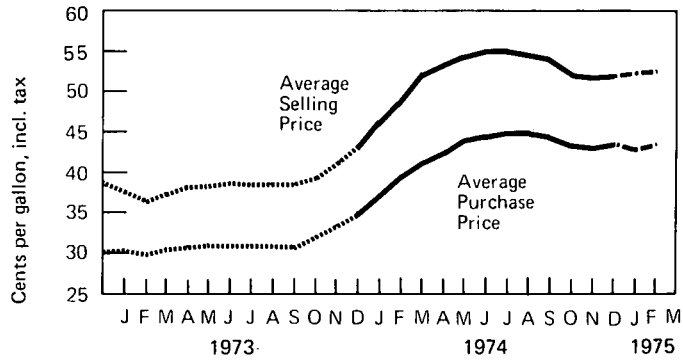
The average price of natural gas in November 1974 registered another slight increase on a national level, continuing the gradual upward trend that began in January 1974. No significant regional fluctuations were noted during the month.

Motor Gasoline

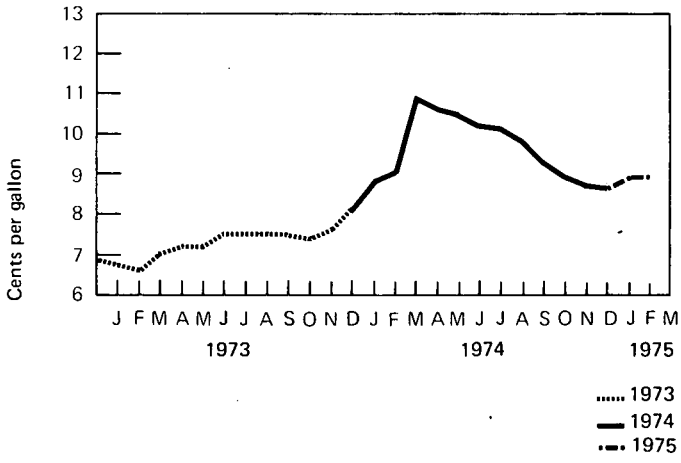
Regular Gasoline at Retail Outlets

		Average Selling Price	Average Purchase Price	Average Dealer Margin
		Cents per gallon, including tax*		
1973	January	37.3	30.5	6.8
	February	36.8	30.1	6.7
	March	37.9	30.8	7.1
	April	38.3	31.0	7.3
	May	38.5	31.2	7.3
	June	38.8	31.2	7.6
	July	38.8	31.2	7.6
	August	38.8	31.2	7.6
	September	38.7	31.1	7.6
	October	39.7	32.2	7.5
	November	41.3	33.6	7.7
	December	43.3	35.1	8.2
1974	January	46.3	37.4	8.9
	February	48.8	39.7	9.1
	March	52.3	41.4	10.9
	April	53.4	42.7	10.7
	May	54.7	44.1	10.6
	June	55.1	44.8	10.3
	July	55.2	45.0	10.2
	August	54.9	45.1	9.8
	September	54.2	44.8	9.4
	October	52.4	43.4	9.0
	November	52.0	43.2	8.8
	December	52.0	43.3	8.7
1975	January	52.4	43.4	9.0
	February	52.5	43.5	9.0

Average Retail Prices For Regular



Average Margins For Regular



*To derive prices excluding taxes, 12.0 cents per gallon may be deducted for 1973 and 12.2 cents per gallon may be deducted for 1974 and 1975.

Sources: Platts Oilgram through September 1973. FEA from October 1973 through December 1974. Lundberg Survey, Inc., from January 1975 forward.

Average Selling Prices at Major and Independent Retail Outlets—February 21, 1975

	Cents per gallon, including tax
Regular Gasoline	
Major	53.1
Independent	48.8
National Average	52.5
Premium Gasoline	
Major	57.8
Independent	53.0
National Average	57.3
Diesel Fuel*	
Truck Stops	
Major	51.1
Independent	48.1
National Average	49.7
Service Stations	
Major	51.5
Independent	48.9
National Average	50.2

*See Explanatory Note 14.
Source: Lundberg Survey, Inc.

Average Margins for Major and Independent Retail Dealers

	Cents per gallon
Regular Gasoline	
Major	9.3
Independent	7.3
National Average	9.0
Diesel Fuel*	
Truck Stops	
Major	6.6
Independent	7.8
National Average	7.0
Service Stations	
Major	7.0
Independent	7.9
National Average	7.3

*See Explanatory Note 14.
Source: Lundberg Survey, Inc.

Average Regional Retail Selling Prices and Dealer Margins for Regular Gasoline—February 21, 1975

FEA Region		Selling Price	Margin
		Cents per gallon, including tax	
1A	New England	52.5	9.4
1B	Mid Atlantic	54.2	8.7
1C	Lower Atlantic	52.7	9.0
2	Mid Continent	52.1	8.5
3	Gulf Coast	50.6	10.3
4	Rocky Mountain	52.4	9.5
5	West Coast	54.0	9.2
National Average		52.5	9.0

Source: Lundberg Survey, Inc.

Motor Gasoline (Continued)

Retail Gasoline Price Changes for Major Oil Companies During February 1975

Company	Effective Date	Amount of Change
		Cents per gallon
Amerada Hess		None
American Petrofina	February 11	0.5
Ashland	February 26	1.0 (Twin Cities)
Atlantic Richfield	February 25	-1.0
B.P.	February 27	1.0
Cities Service	February 25	1.5
Champlin	February 6	1.0
Continental		None
Exxon		None
Getty		None
Gulf		None
Kerr-McGee	February 1	2.0
Mobil	February 20	-1.0
Phillips		None
Shell	February 28	2.0
Standard Oil of California		None
Standard Oil of Indiana		None
Standard Oil of Ohio	February 27	1.0
Sun	February 13	2.0
Texaco		None
Union Oil of California		None

Source: FEA Survey.

Major Brand Regular Gasoline, February 1975

Marketing Region	Retail DTW Price	Change from Previous Month	Branded Jobber Price	Change from Previous Month	Regional Jobber Margin	Change from Previous Month
			Cents per gallon			
Northeast	32.78	0.50	28.37	0.60	4.41	-0.10
Mid Atlantic	32.11	0.47	28.24	0.49	3.87	-0.02
Southeast	31.58	0.41	27.77	0.42	3.81	-0.01
Central	32.80	0.68	28.65	0.48	4.15	0.20
Western	32.06	-0.14	28.31	-0.15	3.75	0.01
Southwest	31.56	0.42	27.57	0.40	3.99	0.02
Pacific	31.23	-0.31	27.49	-0.30	3.74	-0.01
Average	32.02	0.29	28.06	0.28	3.96	0.01

Source: FEA Survey.

Heating Oil

Average Prices for January 1975

	Average Purchase Price	Residential		Institutional and Utility		Industrial	
		Selling Price	Margin	Selling Price	Margin	Selling Price	Margin
		Cents per gallon					
New England	29.8	38.6	8.8	36.7	6.9	36.4	6.6
Mid Atlantic	29.5	37.5	8.0	36.1	6.6	36.5	7.0
Southeast	28.9	36.0	7.1	35.1	6.2	35.4	6.5
East North Central	26.1	32.7	6.6	32.0	5.9	32.9	6.8
West North Central	27.4	33.0	5.6	32.8	5.4	33.0	5.6
East South Central	NA	NA	NA	NA	NA	NA	NA
Mountain	30.1	37.0	6.9	35.2	5.1	34.0	3.9
West Coast	29.8	38.5	8.7	36.6	6.8	36.1	6.3
National Average	28.8	36.2	7.4	34.9	6.1	34.9	6.1

NA = Not available.
Source: FEA.

Price Changes for Major Oil Companies During February 1975

Company	Effective Date	Amount of Change
		Cents per gallon
Amerada Hess		None
American Petrofina		None
Ashland		None
Atlantic Richfield	February 25	-2.0
B.P.	February 27	2.0 (Ohio)
Cities Service		None
Champlin		None
Continental		None
Exxon		None
Getty		None
Gulf		None
Kerr–McGee	February 1	-1.0
Mobil	February 20	-1.0
Phillips		None
Shell		None
Standard Oil of California		None
Standard Oil of Indiana	February 3	2.6
Standard Oil of Ohio	February 27	2.0 (Ohio)
Sun	February 13	2.0
Texaco	February 21	-1.5 (East); -4.0 (Mid and Far West)
Union Oil of California		None

Source: FEA Survey.

Crude Oil

Percentage of Domestic Production Sold at Controlled and Uncontrolled Prices

		Controlled	Uncontrolled		
		Old Oil	New Oil	Released	Stripper
1974	January	60	17	10	13
	February	62	15	10	13
	March	60	16	11	13
	April	60	16	11	13
	May	62	15	10	13
	June	63	15	9	13
	July	64	15	9	12
	August	66	14	8	12
	September	67	13	8	12
	October	66	14	8	12
	November	67	13	8	12
	December	66	14	8	12

Source: FEA.

Domestic Crude Petroleum Prices at the Wellhead

		Old	New
		Dollars per barrel	
1974	January	5.25	9.82
	February	5.25	9.87
	March	5.25	9.88
	April	5.25	9.88
	May	5.25	9.88
	June	5.25	9.95
	July	5.25	9.95
	August	5.25	9.98
	September	5.25	10.10
	October	5.25	10.74
	November	5.25	10.90
	December	5.25	11.08
1975	January	5.25	*11.28

*Preliminary estimate.
Source: FEA.

Refiner Acquisition Cost of Crude Petroleum*

		Domestic	Imported	Composite
			Dollars per barrel	
1974	January	6.72	9.59	7.46
	February	7.08	12.45	8.57
	March	7.05	12.73	8.68
	April	7.21	12.72	9.13
	May	7.26	13.02	9.44
	June	7.20	13.06	9.45
	July	7.19	12.75	9.30
	August	7.20	12.68	9.17
	September	7.18	12.53	9.13
	October	7.26	12.44	9.22
	November	7.46	12.53	9.41
	December	7.39	12.82	9.28
1975	January	**7.70	**12.63	**9.56

**Preliminary data.
Source: FEA.

Estimated Landed Cost of Imported Crude Petroleum From Selected Countries*

		Algeria	Canada	Indonesia	Iran	Nigeria	Saudi Arabia	U. A. Emirates	Venezuela
					Dollars per barrel				
1973	December	NA	6.32	6.42	6.37	8.54	5.49	NA	6.70
1974	January	NA	6.70	NA	8.53	12.13	NA	NA	10.28
	February	NA	10.90	NA	12.11	12.74	NA	NA	11.31
	March	NA	11.14	12.13	13.02	13.26	NA	NA	11.78
	April	13.63	11.02	12.49	12.83	13.67	11.59	NA	11.38
	May	14.67	11.47	12.95	13.84	13.83	11.53	NA	11.28
	June	14.43	12.56	13.21	13.44	13.03	11.32	13.06	10.39
	July	13.65	12.65	13.77	13.02	12.75	11.97	12.34	10.64
	August	13.96	12.49	14.38	12.31	12.70	12.16	12.69	11.20
	September	13.83	12.51	13.42	11.87	12.28	11.45	NA	11.01
	October	13.20	12.53	14.24	12.07	12.12	11.51	12.84	10.95
	November	13.43	12.33	13.45	12.15	R12.83	12.15	R13.54	11.15
	December	13.08	12.15	14.15	11.63	12.88	11.75	14.59	11.37

NA = Not available.
R = Revised data.
Source: FEA.
*See Explanatory Note 15.

Utility Fossil Fuels

COST OF FOSSIL FUELS DELIVERED TO STEAM-ELECTRIC UTILITY PLANTS

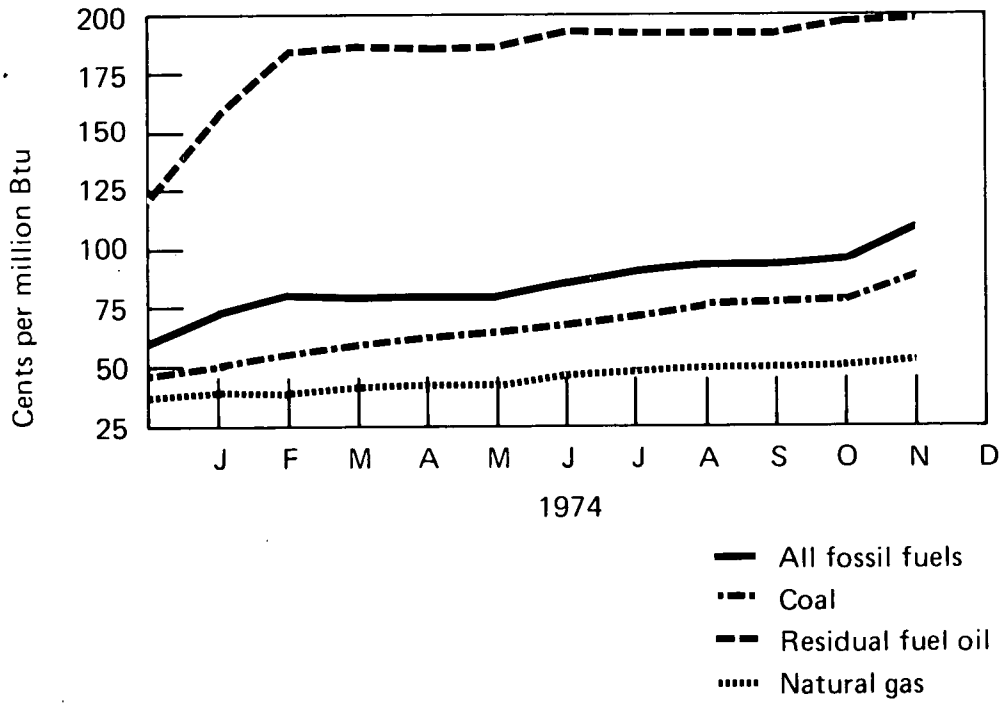
All Fossil Fuels*

Cents per million Btu

Region	1974	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV
New England		147.7	175.7	192.7	186.8	180.0	184.7	186.2	191.4	191.6	192.6	198.7
Middle Atlantic		111.6	129.0	123.9	124.9	124.2	137.6	144.7	147.8	137.5	139.1	170.7
East North Central		52.5	57.0	62.3	63.7	68.9	76.9	79.1	82.7	82.5	84.6	102.0
West North Central		47.8	40.5	36.5	42.4	43.9	47.2	45.3	50.3	51.0	50.0	60.0
South Atlantic		88.5	100.6	102.8	105.9	109.8	119.0	123.7	128.2	132.3	128.4	144.3
East South Central		46.0	52.4	54.1	54.4	58.3	62.5	65.7	68.2	69.7	75.2	86.7
West South Central		48.9	46.2	48.0	44.1	47.3	50.0	59.4	57.1	52.1	53.7	58.0
Mountain		43.7	48.1	42.7	43.1	36.3	40.3	45.0	46.8	45.0	47.8	45.8
Pacific		119.7	160.3	114.1	117.8	122.4	117.9	118.9	118.8	127.3	132.8	157.7
National Average		74.4	81.6	80.9	81.1	81.2	87.7	92.2	95.4	95.9	97.7	111.3

*See Explanatory Note 16.

National Average



Coal

Cents per million Btu

Region 1974	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV
New England	102.8	114.2	132.0	136.8	128.8	95.9	106.8	93.7	93.9	110.3	108.0
Middle Atlantic	60.2	69.5	73.1	80.8	79.3	88.6	94.3	97.4	95.2	94.6	117.4
East North Central	48.9	52.4	57.4	59.2	65.3	71.7	73.0	77.7	78.1	79.5	95.0
West North Central	36.7	36.3	37.7	41.0	41.7	42.0	44.0	48.3	50.5	48.7	57.0
South Atlantic	66.3	76.7	81.7	85.3	88.0	90.2	100.4	107.5	114.5	112.6	126.8
East South Central	43.3	49.8	51.6	52.7	54.2	57.9	57.7	61.6	64.1	69.7	77.8
West South Central	13.6	13.6	13.6	13.6	13.6	17.7	17.7	17.7	17.7	21.0	21.0
Mountain	25.9	26.8	26.1	26.7	24.9	25.7	25.0	25.1	25.1	26.7	28.3
Pacific	35.0	NA	35.1	35.3	35.6	35.5	37.8	38.3	39.0	38.5	38.6
National Average	51.4	56.9	60.8	64.0	65.8	69.5	72.9	77.3	79.1	80.9	90.3

Residual Fuel Oil*

Cents per million Btu

Region 1974	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV
New England	156.6	190.5	208.1	199.4	193.1	201.1	199.2	201.8	199.8	202.0	207.5
Middle Atlantic	186.5	208.1	212.2	196.0	208.6	207.7	208.6	204.5	200.7	205.4	205.7
East North Central	110.3	127.2	158.3	183.6	138.7	198.2	182.7	164.4	161.5	161.3	167.1
West North Central	160.0	154.8	169.1	178.2	160.9	179.3	152.7	178.1	182.6	179.5	190.7
South Atlantic	140.6	167.3	172.7	172.8	174.9	181.5	178.7	178.9	179.3	183.3	182.2
East South Central	112.5	132.2	136.0	153.0	164.9	171.5	169.6	172.6	173.9	171.8	167.9
West South Central	107.5	126.8	144.6	159.4	152.1	161.1	187.5	179.3	180.8	186.0	179.7
Mountain	159.2	174.9	172.1	174.1	194.4	199.2	176.2	179.0	186.7	185.0	185.1
Pacific	155.5	191.2	161.8	180.8	188.7	202.5	204.9	220.3	222.3	223.8	219.5
National Average	158.2	185.9	188.0	186.5	188.1	194.9	194.2	194.6	194.3	198.2	198.9

Natural Gas**

Cents per million Btu

Region 1974	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV
New England	57.1	73.3	134.2	116.4	116.3	124.7	138.7	141.2	132.5	NA	NA
Middle Atlantic	64.2	72.7	72.4	59.5	59.3	77.3	85.2	74.2	80.5	64.8	70.0
East North Central	63.8	62.4	65.7	60.1	72.0	76.1	77.3	80.5	84.3	83.3	80.3
West North Central	35.7	38.0	39.5	41.2	41.8	41.7	42.1	43.3	43.8	43.0	44.8
South Atlantic	51.7	57.3	61.9	63.2	57.8	59.8	60.9	58.3	55.8	58.5	60.2
East South Central	45.5	48.1	47.7	50.7	50.5	52.8	63.3	58.9	71.2	74.3	76.9
West South Central	32.9	35.2	37.6	39.1	39.5	43.6	43.8	46.8	46.0	47.8	51.5
Mountain	47.9	54.5	48.4	48.3	48.8	49.2	50.8	49.5	52.1	55.7	56.6
Pacific	48.2	47.6	46.6	49.8	50.4	50.7	60.0	64.0	64.7	65.9	64.0
National Average	37.3	39.8	42.5	43.6	44.0	47.9	49.8	51.8	52.4	53.2	54.0

NA = Not available.
*See Explanatory Note 16.
**Includes small quantities of coke oven gas, refinery gas, and blast furnace gas.
Source: Federal Power Commission.

Definitions

Base Production Control Level
The total number of barrels of domestic crude petroleum produced from a particular property in the corresponding month of 1972.

Ceiling Price
The maximum permissible selling price for a particular grade of domestic crude petroleum in a particular field is the May 15, 1973, posted price plus $1.35 per barrel.

Controlled Crude Oil
Domestically produced crude petroleum that is subject to the ceiling price for crude oil. For a particular property which is not a stripper-well lease, the volume of controlled oil equals the base production control level minus an amount of released oil equal to the new oil production from that property.

Crude Oil Domestic Production
The volume of crude oil flowing out of the ground. Domestic production is measured at the wellhead and includes lease condensate, which is a natural gas liquid recovered from lease separators or field facilities.

Crude Oil Imports
The monthly volume of crude oil imported which is reported by receiving refineries, including crude oil entering the U.S. through pipelines from Canada.

Crude Oil Input to Refineries
Total crude oil used as input for the refining process, less crude oil lost or used for refinery fuel.

Crude Oil Stocks
Stocks held at refineries and at pipeline terminals. Does not include stocks held on leases (storage facilities adjacent to the wells), which historically total approximately 13 million barrels.

Dealer Tankwagon (DTW) Price
The price at which a retail dealer purchases gasoline from a distributor or a jobber.

Distillate Fuel Oil
The lighter fuel oils distilled off during the refining process. Included are products known as ASTM grades Nos. 1 and 2 heating oils, diesel fuels, and No. 4 fuel oil. The major uses of distillate fuel oils include heating, fuel for on- and off-highway diesel engines, and railroad diesel fuel. Minor quantities of distillate fuel oils produced and/or held as stocks at natural gas processing plants are not included in this series.

Domestic Demand for Refined Petroleum Products
A calculated value, computed as domestic production plus net imports (imports less exports), less the net increase in primary stocks. It, therefore, represents the total disappearance of refined products from primary supplies.

Domestic Non-controlled Crude Oil
That portion of domestic crude oil production including new, released, and stripper oil which may be sold at a price exceeding the ceiling price.

Electricity Production
Production at electric utilities only. Does not include industrial electricity generation.

Firm Natural Gas Service
High priority gas service in which the pipeline company is under contract to deliver a specified volume of gas to the customer on a non-interruptible basis. Residential and small commercial facilities usually fall into this category.

Interruptible Natural Gas Service
Low priority gas service in which the pipeline company has the contractual option to temporarily terminate deliveries to customers by reason of claim of firm service customers or higher priority users. Large commercial facilities, industrial users, and electric utilities usually fall into this category.

Jet Fuel
Includes both naphtha-type and kerosine-type fuels meeting standards for use in aircraft turbine engines. Although most jet fuel is used in aircraft, some is used for other purposes, such as for generating electricity in gas turbines.

Jobber
A petroleum distributor who purchases refined product from a refiner or terminal operator for the purpose of reselling to retail outlets and commercial accounts or for the purpose of retailing through his own retail outlets.

Jobber Margin
The difference between the price at which a jobber purchases refined product from a refiner or terminal operator and the price at which the jobber sells to retail outlets. This does not reflect margins obtained by jobbers through retail sales or commercial accounts.

Jobber Price
The price at which a petroleum jobber purchases refined product from a refiner or terminal operator.

Landed Cost
The cost of imported crude oil equal to actual cost of crude at point of origin plus transportation cost to the United States.

Line Miles of Seismic Exploration
The distance along the earth's surface that is covered by seismic traverses.

Motor Gasoline Production
Total production of motor gasoline by refineries, measured at refinery outlet. Relatively small quantities of motor gasoline are produced at natural gas processing plants, but these quantities are not included.

Motor Gasoline Stocks
Primary motor gasoline stocks held by gasoline producers. Stocks at natural gas processing plants are not included.

Natural Gas Imports
This is based on data collected by the Federal Power Commission from major interstate pipeline companies.

Natural Gas Liquids
Products obtained from natural gasoline plants, cycling plants, and fractionators after processing the natural gas. Included are ethane, liquified petroleum (LP) gases (propane, butane, and propane-butane mixtures), natural gasoline, plant condensate, and minor quantities of finished products such as gasoline, special naphthas, jet fuel, kerosine, and distillate fuel oil.

Natural Gas Marketed Production
Gross withdrawals from the ground, less gas used for repressuring and quantities vented and flared. Gas volumes are reported at a base pressure of 14.73 pounds per square inch absolute at 60°F. Data are from Bureau of Mines and are collected from reports received from the Interstate Oil Compact Commission provided by State agencies.

New Oil
The volume of domestic crude petroleum produced from a property in a specific month which exceeds the base production control level for that property.

Old Oil
Same as controlled crude oil.

Primary Stocks of Refined Petroleum Products
Stocks held at refineries, bulk terminals, and pipelines. They do not include stocks held in secondary storage facilities, such as those held by jobbers, dealers, independent marketers, and consumers.

Refiner Acquisition Cost
The cost to the refiner, including transportation and fees, of crude petroleum. The composite cost is the average of domestic and imported crude costs and represents the amount of crude cost which refiners may pass on to their customers.

Released Oil
That portion of the base production control level for a property which is equal to the volume of new oil produced in that month and which may be sold above the ceiling price. The amount of released oil may not exceed the base production control level for that property.

Residual Fuel Oil
The heavier oils that remain after the distillate fuel oils and lighter hydrocarbons are boiled off in refinery operations. Included are products known as ASTM grades Nos. 5 and 6 oil, heavy diesel oil, Navy Special Oil, Bunker C oil, and acid sludge and pitch used as refiner fuels. Residual fuel oil is used for the production of electric power, for heating, and for various industrial purposes.

Rotary Rig
Machine used for drilling wells that employs a rotating tube attached to a bit for boring holes through rock.

Separative Work Unit (SWU)

The measure of work required to produce enriched uranium from natural uranium. Enrichment plants separate natural uranium feed material into two groups, an enriched product group with a higher percentage of U-235 than the feed material and a depleted tails group with a lower percentage of U-235 than the feed material. To produce 1 kilogram of enriched uranium containing 2.8 percent U-235, and a depleted tails assay containing 0.3 percent U-235, it requires 6 kilograms of natural uranium feed and 3 kilograms of separative work units (3 SWU).

Stripper Well Lease
A property of which the average daily production of crude petroleum and petroleum condensates, including natural gas liquids, per well did not exceed 10 barrels per day during the preceding calendar month.

Total Refined Petroleum Products Imports
Imports of motor gasoline, naphtha-type jet fuel, kerosine-type jet fuel, liquified petroleum gases, kerosine, distillate fuel oil, residual fuel oil, petrochemical feedstocks, special naphthas, lubricants, waxes, and asphalt. Imports of bonded bunkers, jet fuel, distillate and residual fuel oils for onshore military use, and receipts from Puerto Rico, the Virgin Islands, and Guam are based on data reported to the Oil Import Administration of FEA. All other figures are compiled by Bureau of Mines from Department of Commerce data.

Well
Hole drilled for the purpose of finding or producing crude oil or natural gas or providing services related to the production of crude oil or natural gas. Wells are classified as oil wells, gas wells, dry holes, stratigraphic tests, or service wells. This is a standard definition of the American Petroleum Institute.

Explanatory Notes

1. The two constituents of the atomic nucleus are protons and neutrons. The number of protons in a nucleus determines its chemical properties, and the sum of the protons and neutrons determines the weight of the nucleus. Protons and neutrons have approximately equal weights. The proton is electrically charged, while the neutron is electrically neutral.

Two nuclei with the same number of protons but different numbers of neutrons are said to be isotopes of the same element. Some combinations of protons and neutrons form stable (non-radioactive) nuclei. Radioactive decay occurs in nuclei which do not have a stable proton-to-neutron ratio. The half-life of a radioactive isotope is a measure of the rate of its decay. After a time duration equal to one half-life, only half of the original radioactive nuclei in a given sample remains. After another half-life, only half of the remaining half (one-fourth of the original nuclei) is left, and so on.

2. Hydrogen in nature consists of two stable isotopes. The predominant isotope has one proton and no neutrons in its nucleus. The isotope with a neutron in addition to the proton is called deuterium, or heavy hydrogen, and comprises only 0.015 percent of hydrogen in nature. Water in which all the hydrogen atoms are deuterium is called heavy water.

3. Quantities of uranium are measured by various units at different stages in the fuel cycle. At the mill, quantities are usually expressed as pounds or short tons of U_3O_8. After the conversion stage, the units of measure are either metric tons (MT) of UF_6 or metric tons of uranium (MTU). The latter designation expresses only the elemental uranium content of UF_6.

Following the enrichment stage, the same units are used, but the U-235 content has been enhanced at the expense of loss of material. At the fabrication stage, UF_6 is changed to UO_2, and the standard unit of measure is the MTU. We have chosen to present all uranium quantities as MTU; conversion factors to other units are given in the section on Units of Measure.

4. The units used to describe power generation at nuclear plants are all based on the watt, which is a unit of power. (Power is energy produced per unit of time.) As with fossil-fueled plants, nuclear plants have three design power ratings. The thermal rating (expressed in thermal megawatts) is the rate of heat production by the reactor core. The gross electrical rating (expressed in electrical megawatts, MWe) is the generator capacity at the stated thermal rating of the plant. The net electrical rating (also expressed in MWe) is the power available as input to the electrical grid after subtracting the power needed to operate the plant. (A typical nuclear plant needs 5 percent of its generated electricity for its own operation.)

The electrical energy produced by a plant is expressed either as megawatt hours (MWhe) or kilowatt hours (KWhe). Tables in the nuclear section show generated electricity as average electrical power. This enables a more direct comparison to design capacity and to previous months' performances. To obtain the quantity of electricity generated during a given time period (in megawatt hours), multiply the average power level (in megawatts) by the number of hours during that period.

The energy extracted from uranium fuel is expressed as thermal megawatt days per metric ton of uranium (MWD/MTU). The production of plutonium in the fuel rods is expressed as kilograms of plutonium per metric ton of discharged uranium (kg/MTU).

5. Uranium in nature consists of two isotopes, U-235 and U-238. U-235 comprises 0.7 percent of natural uranium. Its atomic weight, 235, is the sum of its 92 protons and 143 neutrons. U-238 comprises 99.3 percent of natural uranium, and its nucleus contains 92 protons and 146 neutrons. This small difference in atomic weight between uranium isotopes causes considerable differences in their nuclear characteristics. U-235 is fissile (fissionable), whereas U-238 is not. When U-238 is bombarded by neutrons, it captures a neutron rather than fissioning, and forms U-239. After two radioactive decays, U-239 becomes a fissile isotope of plutonium, Pu-239.

6. Domestic production of energy includes production of crude oil and lease condensate, natural gas (wet), and coal (anthracite, bituminous, and lignite), as well as electricity output from hydroelectric and nuclear powerplants and industrial hydroelectric power production. The volumetric data were converted to approximate heat contents (Btu-values) of the various energy sources using conversion factors listed in the Units of Measure.

7. Domestic consumption of energy includes domestic demand for refined petroleum products, consumption of coal (anthracite, bituminous, and lignite) and natural gas (dry), electricity output from hydroelectric and nuclear powerplants, industrial hydroelectric power production, and imports of electric power. Approximate heat contents (Btu-values) were derived using conversion factors listed in the Units of Measure. Electricity imports were converted using the Btu-content of hydroelectric power. 1975 electricity imports were estimated on the basis of imports levels during 1974.

8. Graphic presentations of petroleum volumetric data show Bureau of Mines (BOM) figures for 1973 through December 1974 and FEA figures for January 1975 forward. FEA monthly data are based on the *Weekly Petroleum Statistics Report* which presents volumetric data on domestic petroleum receipts and imports for all refiners and bulk terminal operators, as well as production and stock levels for each major petroleum product.

Conceptually, the major difference between FEA and BOM data occurs in the "Stocks" series. Stock levels reported by FEA for the major petroleum products are higher than those reported by BOM, because the FEA series includes stocks of independent terminal operators not counted by BOM.

In the current issue, cumulative 1972 and 1973 petroleum data presented in the text are based on BOM figures. Discussions of cumulative 1974 data are based on BOM figures for the first 11 months and FEA figures for the last month of the year.

9. Oil heating degree-days relate demand for distillate heating fuel to outdoor air temperature. Heating degree-days are defined as deviations of the mean daily temperature at a sampling station below a base temperature equal to 65°F by convention. Numerous studies have shown that when the outside temperature is 65°, most buildings can maintain an indoor air temperature of 70° without the use of heating fuels.

Mean daily temperature information is forwarded to the National Oceanic and Atmospheric Administration, Department of Commerce, from approximately 200 weather stations around the country. These data are used to calculate statewide heating degree-day averages based on population. The population-weighted State figures are aggregated into Petroleum Administration for Defense Districts and the national average, using a weighting scheme based on each State's consumption of distillate fuel oil per degree-day (1972 data base).

10. Domestic demand figures for natural gas liquids (NGL) as reported by BOM and reproduced in this volume do not include amounts utilized at refineries for blending purposes in the production of finished products, principally gasoline. Consumption of NGL at refineries for this purpose has remained at a fairly constant level since 1972 of around 700,000 850,000 barrels per day. NGL domestic demand statistics do incorporate, however, some liquefied gases produced at refineries (LRG) which are used for fuel and petrochemical feedstocks. The NGL production and stock series reported in this volume include only those liquids obtained from or held as stocks at natural gas processing plants and do not incorporate minor quantities of these liquids produced and/or held as stocks at refineries.

11. Bituminous coal and lignite consumption data reported by the Bureau of Mines are derived from information provided by the Federal Power Commission, Department of Commerce, and reports from selected manufacturing industries and retailers. Domestic consumption data in this series, therefore, approximate actual consumption. This is in contrast to domestic demand reported for petroleum products, which is a calculated value representing total disappearance from primary supplies.

12. Bituminous coal and lignite production is calculated from the number of railroad cars loaded at mines, based on the assumption that approximately 60 percent of the coal produced is transported by rail. Production data are estimated by the Bureau of Mines from Association of American Railroads reports of carloadings.

13. Mileage estimates for 1974 and 1975 were derived by multiplying the monthly seismic crew counts by the average number of miles traversed per crew month in 1973.

14. Prior to January 1975, diesel fuel prices were obtained from retail gasoline dealers that also sold diesel fuel. Beginning in January 1975, the diesel fuel survey was expanded to include selected truck stops plus additional retail gasoline dealers that sold diesel fuel. Consequently, diesel fuel prices for January 1975 forward are not exactly comparable to prior data. Selling price estimates are based on a survey of 31 cities. Margins are based on a survey of 10 cities.

15. The refiner acquisition cost of imported crude petroleum is the average landed cost of imported crude petroleum to the refiner and represents the amount which may be passed on to the consumer. The estimated landed cost of imported crude petroleum from selected countries does not represent the total cost of all imported crude. Imported crude costs to U.S. company-owned refineries in the Caribbean are not included in the landed cost, and costs of crude petroleum from countries which export only small amounts to the U.S. are also excluded.

16. The weighted average utility fuel cost for the total United States includes distillate fuel oil consumed by utilities whereas the regional breakdown for residual fuel oil prices represents only No. 6 fuel oil prices.

Units of Measure

Weight

1 metric ton	*contains*	1.102 short tons

Conversion Factors for Crude Oil
Average gravity

1 barrel (42 gallons)	*weighs*	0.136 metric tons (0.150 short tons)
1 metric ton	*contains*	7.33 barrels
1 short ton	*contains*	6.65 barrels

Conversion Factors for Uranium

1 short ton (U_3O_8)	*contains*	0.769 metric tons of uranium
1 short ton (UF_6)	*contains*	0.613 metric tons of uranium
1 metric ton (UF_6)	*contains*	0.676 metric tons of uranium

Approximate Heat Content of Various Fuels

Petroleum	
Crude oil	5.800 million Btu/barrel
Refined products, average	5.517 million Btu/barrel
Gasoline	5.248 million Btu/barrel
Jet fuel, average	5.592 million Btu/barrel
Naphtha-type	5.355 million Btu/barrel
Kerosine-type	5.670 million Btu/barrel
Distillate fuel oil	5.825 million Btu/barrel
Residual fuel oil	6.287 million Btu/barrel
Natural gas liquids	4.031 million Btu/barrel
Natural gas	
Wet	1,093 Btu/cubic foot
Dry	1,021 Btu/cubic foot
Coal	
Bituminous and lignite	
Production	24.01 million Btu/short ton
Consumption	23.65 million Btu/short ton
Anthracite	25.40 million Btu/short ton

Electricity Conversion Heat Rates

Fossil fuel steam-electric	
Coal	10,176 Btu/kilowatt hour
Gas	10,733 Btu/kilowatt hour
Oil	10,826 Btu/kilowatt hour
Nuclear steam-electric	10,660 Btu/kilowatt hour
Hydroelectric	10,379 Btu/kilowatt hour
Electricity Consumption	3,412 Btu/kilowatt hour

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